

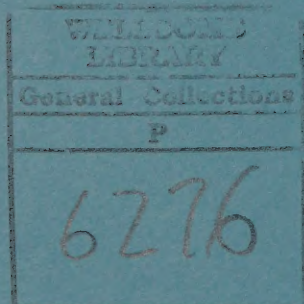
House of Commons

Committee of Public Accounts

**DELIVERING THE
COMMERCIALISATION
OF PUBLIC SECTOR
SCIENCE**

Fifty-ninth Report of Session 2001–02

HC 689



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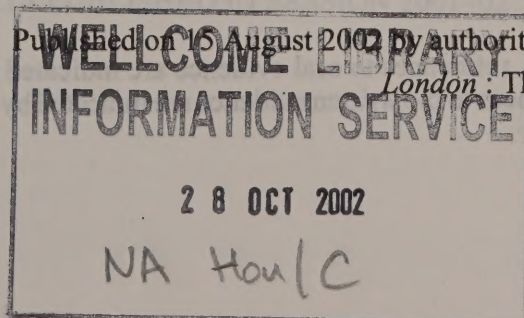
Fifty-ninth Report of Session 2001–02

*Report, together with
Proceedings of the Committee,
Minutes of Evidence and an Appendix*

Ordered by The House of Commons to be printed 17 July 2002

HC 689

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Committee of Public Accounts

The Committee of Public Accounts is appointed by the House of Commons to examine “the accounts showing the appropriation of the sums granted by Parliament to meet the public expenditure, and of such other accounts laid before Parliament as the committee may think fit” (Standing Order No. 148).

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Footnotes

In the footnotes of this Report, references to oral evidence are indicated by 'Q' followed by the question number; references to the written evidence are indicated by the page number as in 'Ev'.
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LIST OF REPORTS PUBLISHED IN SESSION 2001–02

FIFTY-NINTH REPORT

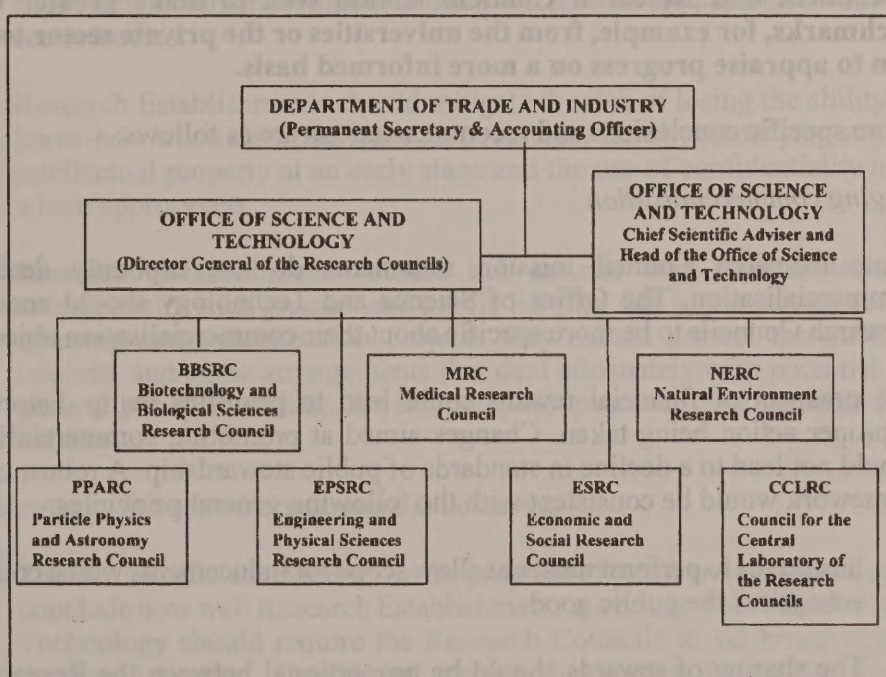
The Committee of Public Accounts has agreed to the following Report:

DELIVERING THE COMMERCIALISATION OF PUBLIC SECTOR SCIENCE

INTRODUCTION AND LIST OF CONCLUSIONS AND RECOMMENDATIONS

1. The Department of Trade and Industry spends over £500 million on research and research facilities in 83 Public Sector Research Establishments (“Research Establishments”) through seven Research Councils (Figure 1). The Government is encouraging Research Establishments to increase the application of their research, in co-operation with the private sector, to stimulate greater economic and social benefits for the nation. This “commercialisation” of research is, nevertheless, intended to remain subsidiary to Research Establishments’ core function of conducting research in support of the public interest.¹

Figure 1: The relationship between the DTI and its Research Establishments



Source: *Department of Trade and Industry*

2. On the basis of a Report by the Comptroller and Auditor General we examined what progress had been made in encouraging the commercialisation of Research Establishments’ output, how the risks and rewards are managed and the monitoring of what is achieved.² We underline three main points:

- **Commercialisation should be carried out with regard to propriety and value for money.** The principles described in our predecessor Committee’s Report, *The Proper Conduct of Public Business* still apply.³ But these need not impede

¹ C&AG’s Report, paras 2–4

² C&AG’s Report, *Delivering the Commercialisation of Public Sector Science* (HC 580, Session 2001–02) examined the Biotechnology and Biological Sciences Research Council, the Medical Research Council and the Natural Environment Research Council

³ 8th Report from the Committee of Public Accounts, *The Proper Conduct of Public Business* (HC 154, Session 1993–94)

commercialisation of research provided due care is taken to avoid undermining the Research Councils' core mission and to safeguard public funds.

- Commercial projects, by their nature, will not all be successful. A sound accountability framework will not focus unduly on the failure of individual projects but will take a balanced overall view of success and failure. The so-called portfolio approach, in which performance is looked at across groups of projects, may offer such advantages. There is little sign, however, of opportunities being appraised and risks being managed on a portfolio basis. **The Department and Research Councils should formulate guidelines about the circumstances in which a portfolio approach is relevant and offer guidance on how best to obtain the benefits.**
- Difficulty in identifying meaningful performance measures and establishing baseline information means that the Office of Science and Technology lacks an objective way of assessing progress in commercialisation by Research Establishments. **The Department and Research Councils should seek to make greater use of benchmarks, for example, from the universities or the private sector to allow them to appraise progress on a more informed basis.**

3. Our more specific conclusions and recommendations are as follows:

On encouraging commercialisation

- (i) Some Research Council mission statements do not explicitly deal with commercialisation. The Office of Science and Technology should encourage Research Councils to be more specific about their commercialisation objectives.
- (ii) The prospect of financial reward could lead to priorities being distorted or improper action being taken. Changes aimed at promoting commercialisation should not lead to a decline in standards of public stewardship. A robust control framework would be consistent with the following general principles:
 - Incentives to perform must not allow scope for inducements which could act against the public good.
 - The sharing of rewards should be proportional between the Research Establishments themselves, and the teams and individuals who work for them.
 - Staff interests should be aligned with their Research Establishment employer, and Research Establishment interests with their public sector stakeholders.
 - Transparency is best served by benefits that are quantifiable in cash terms and awarded by managers who do not stand to gain personally and who are accountable for managing the risks.
- (iii) At present the Treasury has to be consulted if, at the departmental level, overall net receipts from all commercial activities exceed 5 per cent of that department's gross discretionary spending. It is not compulsory for the Department automatically to apply the same 5 per cent limit to each individual Research Council. The Department should make clear on an individual basis what rules will apply to each Research Council.
- (iv) Scientists believe that involvement in commercialisation activity is often not adequately recognised in staff appraisals and may affect their career adversely

because of a perceived conflict between publishing research results and the confidentiality that commercialisation often requires. The Office of Science and Technology should evaluate evidence from staff appraisal systems and propose changes if appropriate.

- (v) There is considerable demand for commercialisation experts in scientific fields and it can be difficult to retain such staff. Other Research Councils should examine whether the salary arrangements for commercialisation experts employed by the Medical Research Council would be a relevant example for them.

On managing the risks and rewards of commercialisation

- (vi) Research Councils vary, for good reasons, in the extent to which they directly support the commercialisation efforts of their Research Establishments. The Department should assess whether different models are equally effective in supporting commercialisation and see that lessons are passed on between public sector bodies.
- (vii) Research Establishments should mitigate the risk of losing the ability to protect know-how when scientists leave for posts elsewhere by identifying and protecting intellectual property at an early stage and the use of confidentiality agreements where appropriate.
- (viii) Research Establishments should not assume that commercialisation will automatically shift product and public liability risk to the private sector. When agreeing commercialisation projects they should protect the public sector's interests and agree arrangements that deal adequately with potential risk to the general public including, for example, the insurance arrangements for product liability.

On monitoring what commercialisation is achieving

- (ix) There is insufficient evidence on the progress of commercialisation from which to conclude how well Research Establishments are doing. The Office of Science and Technology should require the Research Councils to set broad objectives for commercialisation. Operational targets should then be set by the Research Establishments themselves after annual appraisal of the scope of their research to assess its potential and outcomes compared with targets.
- (x) The development of a clear framework of responsibilities, targets and evaluation criteria which offers the right incentives, is kept up to date, and is open to external validation is likely to lead to improved commercialisation performance. The range of existing performance indicators should be supplemented, for example, by measures of financial performance and linked to relevant external benchmarks.
- (xi) More of the members of Research Councils should be drawn from outside the potentially narrow circles of public sector science and the business community that uses their research. For such external members to make a significant impact, their role should go beyond attendance at Research Council meetings so as to provide challenge and external scrutiny, for example by taking lead roles in remuneration and audit committees.

ENCOURAGING COMMERCIALISATION

4. Although the United Kingdom has a strong research record, it is widely considered to have been less successful in capturing the economic benefits of scientific advances. The

Government has therefore placed emphasis on potential improvements to the competitiveness and growth of the UK economy from more effective commercialisation of research, without compromising the commitment to scientific excellence. Although the focus is on these wider benefits the Government has also emphasised the need for the public sector to obtain the maximum financial return consistent with securing the benefits.⁴

5. All Research Establishments have some scope for commercialisation, depending on factors such as the nature of the science pursued and the level of demand from the market sector in which they operate. We took evidence from three Research Councils covering the majority of the Research Establishments. The Biotechnology and Biological Sciences Research Council sponsors eight large institutes covering agriculture, bioprocessing, chemical, animal healthcare, pharmaceutical and other related industries. The Medical Research Council covers a wide range of research fields relating to human healthcare through some 40 units. The Natural Environment Research Council covers terrestrial, marine and freshwater biology and atmospheric, hydrological, oceanographic and polar sciences and Earth observation and environmental monitoring.

6. In 1999 the Government commissioned the Baker Report⁵ to help stimulate commercialisation by Research Establishments whose performance, in many cases, was thought to lag behind the university sector. This report recommended that all government purchasers of public sector research should have, as part of their research mission, the explicit objective of transferring research outputs to the wider economy. In its response to this report in November 1999 the Government said that this proposal would be addressed. Only one of the three Research Councils examined by the National Audit Office, however, recognised commercialisation explicitly in its mission statement.⁶

7. The Government also changed civil service conduct rules, as a result of recommendations in the Baker Report, to allow government scientists to benefit from new incentives and rewards for commercialisation activity. Until then the view was that any benefits from commercialisation activity belonged to the public sector because government scientists had already been paid, through their salaries, for carrying out the activity. The Office of Science and Technology published guidance on the management of conflicts of interest at the same time.⁷

8. The prospect of financial reward for commercialisation may on occasion lead to a distortion of priorities. The Department of Trade and Industry believes that in most cases commercialisation supports and complements the core scientific role of a research establishment. A key component of the Office of Science and Technology's assessment of Research Councils' progress is how commercialisation is being used to support rather than detract from the core mission, and whether research priorities are still being driven by the public good.⁸

9. The prospect of personal financial gain also opens up the risk of decisions being taken at the expense of the public sector, for example by individuals transferring intellectual property, improperly, into a private sector company, which they have a stake in. Our predecessors' 1994 Report, *The Proper Conduct of Public Business* was pertinent to changes in public sector management intended to encourage a more entrepreneurial

⁴ C&AG's Report, para 4.1

⁵ This report was commissioned by the Treasury and the Department of Trade and Industry from Mr John Baker, then Chairman of Medeva plc, into realising the economic potential of the Research Establishments (published August 1999).

⁶ C&AG's Report, para 2.10

⁷ *Good Practice for Public Sector Research Establishments on Staff Incentives and the Management of Conflicts of Interest*, Office of Science and Technology, July 2000

⁸ Qs 5, 72-79

approach. Our predecessors referred to the importance of a framework of effective systems of control and accountability supported by responsible attitudes.⁹

10. To encourage commercialisation the Government allows Research Councils and their Research Establishments to retain the receipts from commercialisation, which they can share as they see fit, unless income from commercialisation, after costs, exceeds five per cent of a Department's gross discretionary spending. There is a requirement to consult the Treasury on how receipts above this limit should be dealt with, which has not been invoked because receipts at the level of the Department of Trade and Industry have not reached this percentage. A key consideration for the Treasury is that a department's core services do not become dependent on receipts which may be uncertain and irregular. Within this 5 per cent threshold it is for the departments to monitor and control the activities of their agencies and non-departmental public bodies (such as the Research Councils).¹⁰

11. There is some evidence that scientists consider that inadequate weight is often given to commercialisation in staff appraisals, as compared to more traditional factors such as peer review of the quality of science.¹¹ An analogous issue has been raised by the Science and Technology Committee, on the status accorded to industrial research outputs by Research Assessment Exercise (RAE) panels. The Committee requested information from the Higher Education Funding Council for England (HEFCE) on the number of patents submitted to Research Assessment Exercise (RAE) panels in each subject area. Though not conclusive, the figures suggested that more patents were submitted by science departments that received low RAE ratings in 2001, leading to a recommendation that HEFCE investigate whether panels have accorded due status to industrial research outputs.¹²

12. Successful commercialisation requires specialist technology transfer expertise, which is in short supply. Public sector salaries may not be competitive enough to attract or retain the necessary staff. The Medical Research Council, which has generated most commercialisation activity believes it has solved its recruitment problems through a flexible pay scheme.¹³

13. A healthy science base is an acknowledged pre-condition for successful commercialisation of science in a competitive international market. The Research Councils told us that they are content that the United Kingdom is competing well internationally in terms of attracting and retaining leading scientists. The Department is championing a co-ordinated approach by the many organisations involved to help maintain the United Kingdom as an attractive base for scientists.¹⁴

14. The Office of Science and Technology referred to the Roberts Report, *SET for success: The supply of people with science, engineering, technology and mathematics skills*, which was published in April 2002, as part of this co-ordinated approach. It noted that the international nature of the labour market contributed to problems of recruitment and retention. That Report said that UK academics were neither particularly well off nor particularly badly off, with salaries falling between those of French and of German

⁹ 8th Report from the Committee of Public Accounts, *The Proper Conduct of Public Business* (HC 154, Session 1993–94)

¹⁰ Qs 48–52, 69–71, 112–123; Ev 24, para 10

¹¹ Q12; C&AG's Report, para 14

¹² 2nd Report from the Science and Technology Committee, *The Research Assessment Exercise* (HC 507, Session 2001–02), para 54

¹³ Qs 39–42

¹⁴ Qs 14–17, 22–25, 42–47, 93–94

academics (see Figure 2 below, taken from the Roberts Report). This accorded with the experience of the Research Councils that we examined.¹⁵

Figure 2: International comparisons of average academic salary spending power

Country	Average annual salary Spending power (£)
Canada	58,289
United States	52,300
Finland	42,939
France	33,647
United Kingdom	31,210
Norway	30,511
Australia	28,654
Spain	23,365
Germany	23,005
Japan	15,481

Source: *Underlying data from Education At a Glance 2001 (OECD)*¹⁶ and www.oecd.org. Japan's low placing in salary terms may be due to reporting total headcount figures rather than full-time equivalents.

15. We asked about the quality of the British education system and its relevance to preparing the next generation of research scientists. The Research Councils told us that many fields of research are becoming less specialised in qualitative terms and more demanding in quantitative terms and there are signs of an emerging shortage of mathematicians and physicists. The Roberts Report also noted an emerging shortage of mathematicians and physicists, compared to the growing numbers of graduates in biology and computer studies.¹⁷

16. As part of the 2002 Spending Review the Government is conducting a cross-cutting review of science and research, in part to review current funding mechanisms and levels, and to identify the priorities for resources across the funding streams held by the Office of Science and Technology and the Department for Education and Skills. The Science and Technology Committee recommended in April 2002 that consideration should be given to ring-fencing additional funding for priority areas, including for mathematicians and physicists who are needed to support commercialisation.¹⁸

¹⁵ Qs 42–45; *SET for Success* (the Roberts Report), table 5.5 International comparisons of the spending power of average UK academic salaries, calculated using a method developed by the National Association of Teachers in Further and Higher Education (NATFHE) based on OECD data which does not, however, distinguish between disciplines or between grades and quality of staff.

¹⁶ The OECD Purchasing Price Index, which takes benefits (which includes pension and other social benefits such as health care), taxes, exchange rates and living costs into account.

¹⁷ Qs 100–106

¹⁸ 2nd Report from the Science and Technology Committee *The Research Assessment Exercise* (HC 507, Session 2001–02) paras 43–45

MANAGING THE RISKS OF COMMERCIALISATION

17. A key commercialisation risk is that scarce resources (scientists' time, funding for protecting intellectual property and to develop market potential and the cost of commercial advice) are used but a project is not successful. Developing a portfolio of related Intellectual Property may help Research Establishments to diversify risk, explore options such as different forms of commercialisation, and possibly increase the number of successful projects. A formal risk management strategy is also likely to have benefits.¹⁹

18. The Research Councils have taken different approaches to the management of commercialisation in their Research Establishments. The Medical Research Council, for example, manages Intellectual Property centrally, shares in its Units' commercial receipts and uses some of these funds to provide centralised advice and seed funding.²⁰ The Biotechnology and Biological Sciences Research Council, on the other hand, has taken none of the proceeds from commercialisation by its institutes and gives them little central support. The Natural Environment Research Council appointed four exploitation scouts to take a strategic view across the whole portfolio with different areas of expertise and to encourage technologies that can provide a platform for commercialisation. The Office of Science and Technology and the Research Councils consider, as did the Baker Report, that there is no evidence to demonstrate that one approach is more effective than another.²¹

19. Partly to develop a common framework to achieve effective commercialisation the Department of Trade and Industry, on 1 May 2002, launched a new initiative "Research Councils UK" in which the Director General and the Chief Executives of the Research Councils work together. One of the objectives of this new initiative is to secure the harmonisation or commonality of functions where there is advantage in doing so. Research Councils UK is to address at an early stage, for example, the establishment of a new knowledge transfer fund.

20. A sophisticated approach to the protection of intellectual property is a key aspect of the effective management of commercialisation. Guidance issued by the Patent Office in March 2002 on the management of intellectual property is intended to lead to a greater understanding of the issues and an improvement in the quality of decision-making.²²

21. Research Councils adopt different approaches to funding and management of intellectual property depending on their different circumstances and the capacity of individual Research Establishments to manage intellectual property effectively. The value of intellectual property is often difficult to assess and protecting it through patents can be expensive. Confidentiality agreements may be effective where the concern is that internationally mobile scientists might lead to intellectual property being lost.²³

22. The Baker Report called for an accountability framework for commercialising public sector research which emphasised portfolio risk management rather than incentivising risk avoidance. The Research Establishments examined by the National Audit Office saw benefits in managing commercialisation projects as a portfolio, although many of them did not have a sufficient flow of projects to allow management on this basis. The potential benefits include more predictable cash flows and helping to avoid dependence on the

¹⁹ Qs 14–21, 135–150

²⁰ Qs 8, 12, 64; C&AG's Report, para 21 and Figure 9

²¹ C&AG's Report, paras 3.6–3.7

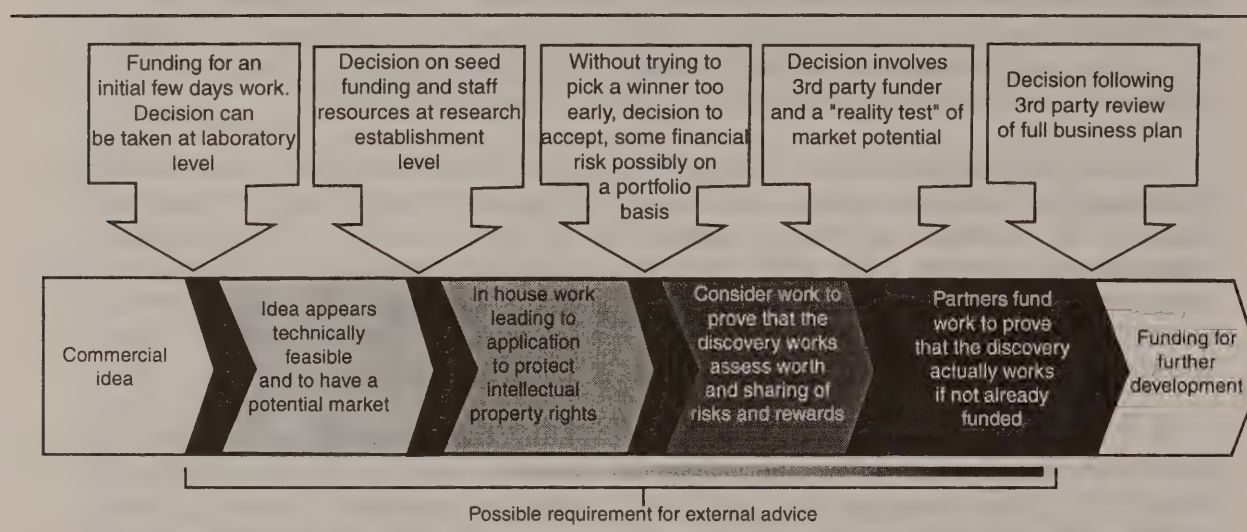
²² *Intellectual Property*, The Patent Office, Universities UK and Association of University Research and Industry Links, March 2002

²³ Qs 17–18, 131–133, 154

success of a single project. There is little, if any, evidence of priority being given to the active development of a balanced portfolio.²⁴

23. The National Audit Office also found little evidence of Research Establishments adopting a formal approach to assessing and managing the risks associated with commercialisation activity. It identified an illustrative formal approach focussing on key risks at key points in the process (see Figure 3, below).²⁵ The benefits of a formal approach include greater assurance that potential is being assessed in a systematic way and that individual deals fit within an overall strategy. The Department of Trade and Industry and Research Councils said that robust approaches to risk management on the lines identified by the National Audit Office were being followed.²⁶

Figure 3: Illustrative decision gate system for commercialisation



Source: *C&AG's Report (HC 580, Session 2001-02)*

24. Research Councils have developed their own individual guidelines about the assessment of risks and opportunity costs. The levels of delegation to take investment decisions vary and are not always fully defined in terms of what constitutes a major or novel deal, requiring additional oversight. Research Councils, therefore, do not necessarily take a consistent approach to reviewing the impact on the direction of the science and the risks and returns achievable compared to other options, including opportunity costs.²⁷

25. The Department of Trade and Industry and the Research Councils consider that in public sector commercialisation deals liabilities are shifted to the private sector, unless it can be demonstrated that the science was in some ways flawed and dishonest. There may also be a need, however, to ensure that the private sector could meet potential liabilities when entering into agreements with them, for example, through insurance provision.²⁸

²⁴ C&AG's Report, paras 3.5–3.19

²⁵ C&AG's Report, paras 4.9, 4.12

²⁶ Qs 127–130, 134–150

²⁷ Q134

²⁸ Qs 127–130

26. The Office of Science and Technology considers that it has checks and balances in place to ensure the integrity of the system so that public service objectives are not distorted by the desire to exploit commercial opportunities. The performance related objectives are set by the Director General for the Research Councils and bonuses are set by a Remuneration Committee involving the Director General together with some of the Research Council members. In addition each Research Council has an Audit Committee which is responsible for overseeing the processes and outcomes of what it is doing. Research Council members are generally drawn from the scientific circles of the public sector and the business community which it serves.²⁹

MONITORING WHAT COMMERCIALISATION IS ACHIEVING

27. The Baker Report recommended in 1999 that Research Establishments should develop performance measures and targets against which their knowledge transfer efforts could be assessed. By the beginning of 2002 some broad measures of Research Establishments interaction with the private sector had been put in place, such as the level of income from the private sector and the number and value of collaborative projects with the private sector. There were no specific measures of commercialisation performance.³⁰

28. Commercialisation in the public sector is by its nature opportunistic as it seeks to exploit, but does not drive, the science research programme. The Department of Trade and Industry is in the process of revising the way in which it assesses and measures commercialisation activity. As opportunities are most frequently identified by the scientific research team involved, it considers that this activity is unsuitable for 'top-down' target setting and that there should be scope for Research Establishments themselves to suggest targets. It is therefore looking at developing a "menu" of indicators to be discussed on a year by year basis with each Research Council. The indicators currently in use include measures such as the level of income received from private sector, the number and value of collaborative or co-funded research projects and the number of co-publications with industry.³¹

²⁹ Qs 11, 85–92, 145

³⁰ Qs 3–4, 151–153

³¹ Qs 1–3, 175

MINUTES OF PROCEEDINGS OF
THE COMMITTEE OF PUBLIC ACCOUNTS

SESSION 2001-02

MONDAY 11 MARCH 2002

Members present:

Mr Edward Leigh, in the Chair

Mr Richard Bacon
Geraint Davies
Mr Barry Gardiner
Mr Nick Gibb
Mr Brian Jenkins

Mr George Osborne
Mr David Rendel
Jon Trickett
Mr Alan Williams

Sir John Bourn KCB, Comptroller and Auditor General, was further examined..

The Committee deliberated.

Mr Brian Glicksman, Treasury Officer of Accounts, was examined.

The Comptroller and Auditor General's Report on Delivering the Commercialisation of Public Sector Science (HC 580) was considered.

Mr Robin Young, Permanent Secretary, Department of Trade and Industry; Mr John Taylor OBE, Director General of the Research Councils, Office of Science and Technology, Department of Trade and Industry; Professor Julia Goodfellow CBE, Chief Executive, Biotechnology and Biological Sciences Research Council; Professor Sir George Radda CBE, Chief Executive, Medical Research Council; and Professor John Lawton CBE, Chief Executive, Natural Environment Research Council, were examined (HC 689-i).

A division of the House being called, the Chairman suspended the meeting for ten minutes.

The Committee resumed.

The witnesses were further examined.

The witnesses withdrew.

* * * * *

[Adjourned until Wednesday 13 March at Four o'clock.

* * * * *

WEDNESDAY 17 JULY 2002

Members present:

Mr Edward Leigh, in the Chair

Mr Richard Bacon
Geraint Davies
Mr Frank Field
Mr Nick Gibb
Mr Brian Jenkins
Mr Nigel Jones

Mr George Osborne
Mr David Rendel
Mr Gerry Steinberg
Jon Trickett
Mr Alan Williams

Mr Tim Burr, Deputy Comptroller and Auditor General, was further examined.

The Committee deliberated.

* * * * *

Draft Report (Delivering the Commercialisation of Public Sector Science), proposed by the Chairman, brought up and read.

Ordered, That the draft Report be read a second time, paragraph by paragraph.

Paragraphs 1 and 2 read and agreed to.

Paragraph 3 postponed.

Paragraphs 4 to 28 read and agreed to.

Postponed paragraph 3 read and agreed to.

Resolved, That the Report be the Fifty-ninth Report of the Committee to the House.

Ordered, That the Chairman do make the Report to the House.

Ordered, That the provisions of Standing Order No. 134 (Select Committees (Reports)) be applied to the Report.

* * * * *

[Adjourned until Monday 21 October at Four o'clock.]

MINUTES OF EVIDENCE

TAKEN BEFORE THE COMMITTEE OF PUBLIC ACCOUNTS

MONDAY 11 MARCH 2002

Members present:

Mr Edward Leigh, in the Chair

Mr Richard Bacon
Geraint Davies
Mr Barry Gardiner
Mr Nick Gibb
Mr Brian Jenkins

Mr George Osborne
Mr David Rendel
Jon Trickett
Mr Alan Williams

SIR JOHN BOURN KCB, Comptroller and Auditor General, Ms PATRICIA LEAHY, Director, National Audit Office, further examined.

MR BRIAN GLICKSMAN, Treasury Officer of Accounts, HM Treasury, further examined.

REPORT BY THE COMPTROLLER AND AUDITOR GENERAL:

Delivering the Commercialisation of Public Sector Science (HC 580)

Examination of Witnesses

MR ROBIN YOUNG, Permanent Secretary, and DR JOHN TAYLOR OBE, Director General of the Research Councils, Office of Science and Technology, Department of Trade and Industry, PROFESSOR SIR GEORGE RADDA CBE, Chief Executive, Medical Research Council, PROFESSOR JULIA GOODFELLOW CBE, Chief Executive, Biotechnology and Biological Sciences Research Council, and PROFESSOR JOHN LAWTON CBE, Chief Executive, Natural Environment Research Council, examined.

Chairman

1. Good afternoon, welcome to the Committee of Public Accounts. Today we are discussing the commercialisation of public sector science. We are delighted to have Mr Robin Young, the Accounting Officer for the Department of Trade and Industry. Would you like to introduce your colleagues?

(*Mr Young*) Directly on my right I have John Taylor, who is the Director General of the Research Council within OST, which is within the DTI. On his right Professor George Radda, Chief Executive of the Medical Research Council and on my immediate left Professor Julia Goodfellow, Chief Executive of the Biotechnology and Biological Sciences Research Council and Professor John Lawton Chief Executive of the Natural Environment Research Council, these three research councils being the ones looked at in this Report.

2. Thank you very much. Perhaps I can introduce the questioning on behalf of my colleagues. Could you please turn to page 15 and look at paragraph 1.7. There you have some pretty general aims, "The government is keen to encourage them" that is the councils "in cooperation with the private sector", et cetera, et cetera. Very general objectives, what does it actually mean? If you read 1.7 an objective observer may come away with the conclusion that you can do whatever you like and it is very difficult to measure what you have achieved. Is that an unfair criticism?

(*Mr Young*) I think it is a bit unfair, Chairman, and I do not think it is one that the Report bears out. What the Report has done is that it has described the Baker Report's recommendations to government on carrying forward the commercialisation effort. It

then goes on to point out mainly how well the research councils are doing in pushing forward that agenda. It then looks at the various forms of commercialisation. If I can draw your attention to the top of page 15, the very page you are on, to Figure 5, where it points out that commercialisation reveals itself in a variety of outputs, none of which are easily susceptible to magic wands or simple targetary. What we are doing here in discussions—and we will, no doubt, go on to describe to you during this session—with the research councils is describing and working-up with them key indicators of success in driving forward commercialisation. There is no simple wand because the six things listed under Figure 5 are very different and they are applied differently in the different research councils because of the different sectors which those councils deal with. We have a system of output indicators, annual discussions, annual reports, indicators of progress and we are looking at various ways of charting that progress. All in all, if I can refer you back to page 8, paragraph 24, what the Report says is, "The Research Establishments we studied as a group, have developed the full range of commercialisation opportunities, from free dissemination of information to venture capital financed spin out companies". That is more the picture, rather than the way you described it.

3. Let us try and cut through this, we are talking here about outputs and outcomes. The output is transferred intellectual property to the private sector companies, the outcome is what they make of it. Where and how is this being measured? How is your success being measured in achieving what is essentially the Government aim in this area?

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[Chairman Cont]

(*Mr Young*) Let me start on that and then my colleagues can help me as they think fit, if that is allowed. The key indicators of progress, which we are discussing with each research council as part of our annual report discussions and operating plan discussions include the following: we look at the level of income; we look at the value of the contracts and the collaborations which they have with the private sector and others; we look at the total number of their patents; we look at the number of their new patents in the year; we look at the number of licensing agreements they have achieved; the number of start-up or spin off companies they achieve and the number of employees in those start-up companies. There are a whole range of things, not one straightforward measure, a whole range of measures which we think are necessary, and the Report gives credit to that, to trace all of the research commercialisation outputs listed in Figure 5 on page 15.

4. If you can now turn to page 5, please, and if you look at paragraph 12 you will see there that, "The Office of Science and Technology is revising the performance indicators that apply to Research Councils to reflect this high level target". Can you tell us a bit about how these indicators are being benchmarked against other research councils and the university sector? Would you like to comment on the anecdotal feeling that the university sector may be better at doing this than the councils, or do you deny that?

(*Dr Taylor*) I begin by saying that I think that the Report shows clearly that over the last three years, or so, we have been in a very positive and fast-changing climate. Policy has been coming from the top which says commercialisation, and so on, is important. A lot of the things that have been in place and picked up in the Report show that basically we are moving very positively in the right direction. It is very important to register that, and in this activity one size does not fit all. What is appropriate for medical research council institutes might be quite different from what is appropriate for other institutes. They are at different stages and different market places with different kinds of science. What we are doing at the moment is revising the way in which we try and measure and assess the kind of activities that are going on, knowing that they are all moving in a very positive direction. That is a process that we will be pulling together, now that the Quinquennial Review has been completed, as we look across the councils and their institutes to try and get a feel for the set of activities that are in place. This is very much an opportunistic activity and it is driven by our science research programme and then a very good process for spotting first class opportunities for commercialisation that come from that.

5. Can I refer you, Mr Young, to page 2, paragraph 4, please. This is what we all know about, that the United Kingdom has a strong record of innovation but it is widely considered to be less successful in capturing the economic benefits of scientific advances. That is very true and we all want to encourage commercialisation, which we are talking about today. How can you ensure that the public

service priorities of these councils are not distorted? We do not want a situation where we are affecting the ability of these councils to do blue sky research because they are plodding after some commercial opportunity?

(*Mr Young*) I could not agree more, which is why the government position is that we only want to encourage commercialisation, broadly speaking, as it says in paragraph 4, as long as that does not compromise the research establishments core scientific role. I should say that in most cases commercialisation very much supports and complements, I would argue, the core scientific roles of these establishments and several people on this table will confirm that. In all of the discussions which John Taylor, the Director General of the Research Council, had with each research council, a key component of that discussion is how they are hitting their core mission, how they are achieving their core mission objective and how commercialisation is being used to support that and not detract from it.

6. Can I refer you to page 22, please, paragraph 2.18, there is rather a noble statement here, "Scientists responding to our survey said that they were not primarily motivated by the potential to make money for themselves". I wanted to pursue this, and this might interest the Committee as well. There are some complaints from dons, particularly in the arts sector—these may be very unfair complaints but I have to put them to you—there are some scientists in the more biology sectors than scientific sectors who are quite good at setting up research projects, getting into intellectual property, transferring them into private companies in which they may have some stake and thereby deriving some personal benefit which may not be in their personal interest. Can you comment on that? Is that an unfair criticism?

(*Mr Young*) The position started with the recommendations of the Baker Report, which are summarised on page 16, which said that they were clear that the opportunities for commercialisation were held back by perceived bias to commercial exploitation. In other words, there are opportunities going missing because there were no opportunities for individual scientists to benefit. That said, the Government only did something about that, namely by changing the Civil Service Code and issuing other guidance to councils on the basis that such exploitation by individual scientists is carefully managed and controlled. If I may, I will ask any Chief Executives here to give examples of that. The government response to the Baker Report recommendations, was quite clear that a key barrier to successful commercialisation, the subject of this Report, was rules preventing individual scientists from benefiting.

7. This never happens, a scientist does not transfer his intellectual property, which he developed with the help of public money, by some sleight of hand into a private company in which he has some stake, it has never happened?

(*Mr Young*) "Never" is a difficult word to use in this Committee. Our guidance is quite explicit on how to manage the risk of that happening. Equally,

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we did deliberately change the Civil Service Code to allow some of that to happen because we were told some exploitation—

8. That seems to be a rather contradictory answer, other colleagues can come in on that if they want to. Can I ask all of your colleague to now turn to page 21, paragraph 2.12. “The senior managers of the Research Establishments covered in this study also recognise that commercialisation should form part of their personal objectives”. Can I ask your colleagues if their personal remuneration contains a variable element linked to successful commercialisation by their research establishments?

(*Professor Sir George Radda*) The answer is no. Our personal remuneration is not linked to any commercial success in my organisation. Incidentally, our commercial exploitation is centrally managed rather than by each institution, which is different from the other research councils, because we have a different relationship between our institute units and the MRC Centre.

9. Is anybody’s remuneration dependent on successful commercialisation performance?

(*Professor Lawton*) If I can take the Natural Environment Research Council, Chairman, the directors of all of the NERC establishments, the British Geological Survey, and so on, have the implementation of the recommendations of the Baker Report in their annual performance objectives, ie one of their performance objectives is to implement the Baker Report. That is also in my objectives. As part of the overall assessment of their performance over the year that will be one of the issues that will be taken into account.

10. If they successfully commercialise they get paid more, they get some sort of bonus?

(*Professor Lawton*) They are on performance-related bonuses across a whole series of activities, and that will be one of the activities that will be taken into account by the Remunerations Committee in assessing their annual performance bonus, yes.

11. How are you and your colleagues ensuring the integrity of the system so that the public service objectives of your council is not distorted by the desire of your staff to exploit commercial opportunities and, therefore, to be paid more? How do you insure the integrity of your council against this?

(*Dr Taylor*) Let me summarise for you the top level sets of checks and balances from OST to the research councils. First of all, each council is required to produce a five-year strategy, a one-year operating plan and a one year annual report and that contains a set of objectives, including activities in the area of commercialisation, as called for in this Report. Their personal objectives are set by me and they have performance-related bonuses which are set by a Remuneration Committee, involving me and some of the research council members, reflecting how well they have implemented those objectives. In addition each research council has an Audit Committee which is responsible for overseeing the processes and the outcomes of what it is doing. Between those three sets of things we seek to encourage a reasonable

commercialisation programme, very much along the lines recognised in the Report, but keeping it under the right set of checks and balances. That is one of the reasons why we steer away at the top level from very specific numeric targets which can, indeed, affect the wrong kind of behaviour, a curious kind of behaviour and why the whole question of metrics and measures in this area needs considerable care.

12. Other colleagues can deal with that further. Can I approach this question from another direction and refer you to paragraph 2.17. “Our survey indicated that this is frequently not done and that scientists believe that their career paths discourages involvement in commercialisation activity”. How big a deterrent is this? Scientists believe that how they get on is doing original research, getting academic papers published and if they are asked to do commercial stuff they are simply not progressing in their career. Is that a fair comment?

(*Professor Goodfellow*) When we review our institutes—and you have to remember that BBSRC has eight independent institutes—we review these every four years in detail. They have annual reviews throughout that as well, and we look at knowledge transfer as one of the things the staff are doing and we also look at the quality of the science and how it is working as an institute, is it fulfilling the strategic aims. It is one of a number of indicators that we are looking at.

(*Dr Taylor*) The population of scientists in any laboratory is not uniform. There are various different mixes of styles of people involved in any sizable research group. Again, one size does not fit all in this case.

13. Can I ask a question based on paragraph 1.9 on page 15 now. I think you have there your three research councils receiving a total of £17 million from commercialisation. What sort of figure would satisfy you as having met your objectives? What are you aiming at?

(*Mr Young*) We have deliberately and explicitly offered no such figure. What we are doing is setting each chief executive a target and constantly increasing and learning from the commercialisation opportunities, bearing in mind warnings that you yourself set us not to detract from the core objective of the core scientific benefit, but equally being keen within that context to maximise opportunities. Each research council is very different. The figures in 1.9 make clear both the different history and also the different opportunities in different areas. We are working away year-on-year looking at the amount of income each earns and we will be tracking in a previous answer I listed, I will not repeat it again, about seven things which we are tracking to indicate progress on commercialisation. Income is but one thing, numbers of employees in start-up companies is as important an indicator, some would say, of commercialisation progress as income. Income is one important thing we are tracking, but there are lots of others to show to what extent people are doing the commercialisation things listed in Figure 5 on page 15.

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Mr Williams

14. In terms of the intellectual seed corn, how far are we losing the battle before we get in there and start fighting? How far are the Americans able to poach our best research students before they even reach the stage where they are possibly going to be attracted by anything that you are offering?

(Mr Young) I will make a general response and ask one of my colleagues to fill it in. You are quite right, Mr Williams, intellectual property and the control thereof is absolutely key to this and is right at the forefront of our concerns. For what it is worth, we issued, via the Patent Office, guidance in December 2001 as to how to balance this very difficult scale.

15. You have not answered the question I asked, which is to you because you are in charge of education, which is, how far are we losing the battle before the education stage, before we reach the productive research stage? How far are the Americans pinching our best young scientists? MIT and Harvard offer very generous inducements to promising people from all over the world. Is there any evidence we are losing any in this way?

(Mr Young) I am so sorry, I missed the point that it was education you were talking about. I do not think there is any evidence of that.

(Dr Taylor) I think what we have seen over the last few years is an intensification of the battle to get people in various leading economies, the Germans, the Americans, and so on, and that is a battle in which we have to be continually be engaged with schemes like the Wolfson Foundation and Royal Society Scheme, part funded by OST, which we launched last year, to actively top-up the remuneration and the packages that we could offer to keep people who are in the United States or anywhere else and to bring them back. I will ask George Radda to tell you about some of the successful refreshments he has managed.

16. I went to MIT and Harvard about a year ago and I was very impressed by the packages they could cobble together if they really wanted somebody. Are we able to match them?

(Professor Sir George Radda) Could I just say that, for example, in an organisation like the laboratory of molecular biology in Cambridge a large percentage, I do not know the exact figure, but it is more than half, of the post-doctorate fellows are non-United Kingdom scientists linked here, rather than going the other way round. We still have no difficulties in filling the studentships with outstanding graduates in our institutes and units. Recently we have been successful in recruiting people, both at junior and senior level, back to this country, either expatriate or to this country from the United States and Germany. We are still competitive, partly in terms of the commercialisation activities, the incentives we can offer, which are also helpful. I happen to have the figures that the MIT invest in research which is something like £515 million per annum compared to our investment which is £180 million, and they will have an income from commercialisation of 4.4 per cent against the MRC income of 9.9 per cent. Actually we compare very favourably on a number of counts with major institutions like MIT.

(Dr Taylor) The other thing that happened very recently is the change made in 2001 to the ability for foreign PhD students to get work permits if it turns out there are commercialisation prospects in the work that they are doing, I think that is a very important step forward to help retain the very best of overseas talent to continue working on projects in England.

17. That does not preclude the possibility that we are losing our top quality people to America and keeping not such high quality people from other countries. That would equally explain the situation you just described. You can put in a note if you wish to, it would be very welcome. How far does the American practice of patenting everything that moves inhibit what we are able to do in this country? I know the two patenting systems are very different. I know the Americans are now, at last, coming into line with the rest of the world and Europe, in particular. Is there a threat to us in their approach to patenting?

(Professor Lawton) I will pick this up as the research council with the least number of patents, because the nature of the environmental work we do does not lend itself as much as it might in the medical area. The Report, of course, does not discuss these issues, Mr Chairman, so the arguments are not necessarily pertinent to the discussions that are in the Report.

18. It does refer to intellectual property as part of the process of preserving intellectual property. There is a fierce difference between us and the Americans, where they are quite parasitic in their approach to it, so we cannot brush it aside.

(Professor Lawton) Where the opportunities exist we do enter into patents quite aggressively within the United Kingdom and within Europe. There are others ways of protecting intellectual property apart from patents.

19. When you have something that is worth developing and you see how far have we developed it. There is considerable reference here to the venture capital involvement. This, again, is something, as you would anticipate, the Americans have been way ahead of us in and how far are we now able at this stage to match them in the appropriateness and the timeliness and the scale of the intervention by venture capital support?

(Professor Sir George Radda) Could I say that several years ago we recognised the difficulties of getting some of the United Kingdom venture capital people to invest in start-up companies in biotechnology, particularly on the biomedical side. This is one of the reasons why we have set up our own venture capital company entirely from private funds, initially £40 million a few years ago and we are now repeating that and have already collected £41 million, and we expect to have more, for what is called MVM Limited.¹ This is a wholly owned venture capital company that the MRC set up. This has been extremely successful in providing venture

¹ Note by Witness: MVM Limited acts as the general partner to the UK Medical Ventures Fund (the first fund) and the MVM International Life Sciences Fund II (the second fund).

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[Mr Williams Cont]

capital and, more importantly, management advice in setting up enough companies. In relation to the US threat that you implied before I think it is important to recognise that the threat is in the volume of research that is being carried out in the US, not in the ease or difficulty of getting patents.

20. Yes. One accepts that we have to address the volume as well as the equality and we are falling behind there, but you would expect to in view of the resources that we have available? I was listening to the radio this morning and I heard someone from Edinburgh, you possible did, who has been doing stem cell research there in relation to diabetes and he was saying that now he has reached the stage where as much as he loves Edinburgh, he loves living there and he loves the university there, he is having to leave Edinburgh to go to Singapore because he cannot raise the—the figure he was quoting was £40 million needed to go to the next stage. Is that a fair description of the situation he has found himself in?

(Professor Sir George Radda) Could I say that the individual you refer to, of course, works not in the academic environment but in a biotechnology company and has found a better opportunity in Singapore. If you talk to our academic researchers, particularly in the stem cell area, actually the conversation is the other way round, we have already attracted one of the top clinical stem cell researchers from the US to the United Kingdom. I am in conversation with a number of others, both at a junior and senior level, and they are all hoping to come to this country to do this sort of research, where the opportunities are excellent.

21. You have this base between what the Chairman referred to as blue sky research and you have what they describe as a university achieving a sort of platform but not a product, how do we manage to finance between developing the intellectual platform and developing the base on which you hope to derive commercial products? How adequately would you deal with that?

(Professor Sir George Radda) I can respond from the MRC's point of view. You obviously need seed funds at three different levels. You, first of all, need seed money, which we are providing to our commercial funds up to the tune of £1 million for what is called filling the development gap, that is going from the results of basic science to a stage where you realise that there are commercial opportunities. The second area that we have put in seed funds is what we call the collaborative centre, which we set up many years ago at Mill Hill and also in Edinburgh. These collaborative centres carry on the research programmes to the stage where the product can be specifically identified. These, again, are now funded from the commercial income and not from public funds. Of course the third area where you need the seed money is when you set up a new spin out company. Our venture capital company, as I mentioned coming entirely from private funds, does that. We are covering the whole range of how to go from the basic science to a commercial product with different ways of putting in seed money.

22. When we get to the stage of moving to commercial production is the quality of our work

force at present adequate to meet the demands? We see in general industrial terms the problems of skill shortage, is there a problem of shortages in the relevant and appropriate workforce back-up able to turn the idea into a product?

(Professor Sir George Radda) I am sure that is also sector dependent. Answering from the biomedical and the medical research point of view, I think we have the quality of people.

23. In sufficient quantities?

(Professor Sir George Radda) In sufficient quantities, in the spin-off companies and the biotechnology companies that we have set up. In many cases these people have been brought in from abroad.

24. Why have we needed to do that?

(Professor Sir George Radda) Movement in science is global, people move in both directions. People will move where the good opportunities are. We have certainly managed to move people round like that.

25. It must also be a function of the reluctance of young people in this country to pursue the appropriate subjects at A-level and university?

(Dr Taylor) I think, first of all, this whole question is being looked at very intensively by Sir Gareth Roberts, who is looking at a review of the whole question of the supply of science right the way through from schools to post graduates and post-doctorates. That is due to report in two or three weeks. I will just reinforce that science is a hugely international affair and, by the way, technology transfers wonderfully on the hoof. One of the most important technology transfer mechanisms is people moving round and coupling to each other the activities they know about. We only fund five per cent of the world's research in the United Kingdom and we need to make sure we tap into the other 95 per cent to find the pieces we do not have and to find the patents and the intellectual property we do not have. International mobility is absolutely crucial. We are not the only country by any means that has a deficit of people. As I said earlier, if you go to France, Germany, America and Japan if you go to any of those places they are intensively campaigning to fill their own deficits of talented people.

Mr Williams: You come to use the term "deficit" rather different from the tone of your initial answer to me, where you omit there was a deficit. I do not want an answer to this, I understand where we are going. I find it a rather interesting transposition, your assessment of our innate capabilities.

Mr Osborne

26. I thought the days when the DTI went round picking winners had long gone. Reading this Report, is that not what you are really doing through your various research councils?

(Mr Young) No. If by picking winners you mean choosing between lame ducks and live ducks, if you are referring to that debate the days have long gone for that. What we are doing here is seeking to encourage the research council to stick to their core mission but also in order to get to that core mission

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quicker and better to maximise the opportunities for commercialisation here. We are encouraging them to maximise the opportunities listed here for all of the various things that can be commercialised without, in any sense, tarnishing their core mission.

27. If I can look at a specific example in paragraph 2.3, the Babraham Institute, here is government money being used for a "Bio-incubator" site which attracts 19 fledgling companies to get going. Surely there, in effect, you are making a decision about which private companies you are going to use public money to help get off the ground, are you not?

(Mr Young) I would say in general we are asking this particular research council, Julia's one, to maximise the opportunities to hit their core mission under the commercialisation heading. Whether we are hitting it or not I do not know.

(Professor Goodfellow) Really very small amounts of money have gone in directly to the institute to set it up. Most of it has come through specific DTI initiatives to get it going. The idea is also to support science and innovation in the United Kingdom. They are performing a very important regional role in that area and they have been very successful. The Cambridge Science Park is more than full. They have planning permission in a difficult area of Cambridgeshire. They have been very successful and this allows them to take their science forward as well as supporting the local economy.

28. As a judgment as to which companies you support and which you do not, are they essentially commercial judgments that this company is going to be a great success or not commercially, or is it what we really need is a bit of this science done in the United Kingdom?

(Professor Goodfellow) It is mainly companies that are in the area and companies that can benefit from the knowledge-base of Babraham. They are using the good quality science of Babraham and they also have access—they pay for their platform technology—to Babraham.

29. Presumably more companies apply to you than you can cope with?

(Professor Goodfellow) Not all Bio-incubators are successful, this one has been unusually successful and very clean. Of course what they are planning now is a public private partnership to go ahead to expand so that more people in the area can come in. That would be a public private partnership that is under discussion at the moment.

30. The same is the true for the Medical Research Council with its venture fund, you are making a judgment about which companies to invest in and which ones not to?

(Professor Sir George Radda) MVM Ltd, which has its own board independent of the MRC, will make the decision on the basis of a detailed evaluation and the proposals it sees, where they should put in their start-up fund, whether it is a spin-off company or not. Consideration will be no different from what any other venture capital company does. Officially the agreement with the MRC, because they largely use some of the MRC technology for spin offs, is that in the first agreement

it was something like 75 per cent of their investment had to be to in MRC-related work. The second round of raising funds have been relaxed a bit more, they can actually give venture capital to any venture.

31. The point I am getting at, Mr Young, is when should the public be investing in research that is of commercial benefit and when should private companies be putting that research in? Astra Zenica's headquarters happen to be in my constituency and they spend hundreds of millions of pounds a year on medical research, that is fine because they make money out of that, they are a private company. Why should I as a taxpayer be competing with Astra Zenica?

(Professor Sir George Radda) You are not paying towards any of this because it comes from the commercial income that we made out of the company's licensing and also patents. The initial seed funds went in from public funds and then we have recovered those funds from the income that has been generated.

32. Originally it was taxpayers' money.

(Professor Sir George Radda) There was a small amount of taxpayers' money in setting up the MRC technology group and in setting up collaborative centres and providing initial seed funds. That has now generated the much expected income, it takes a long time of generated income to recover all of this, plus more.

(Professor Goodfellow) The Bio-incubator, for instance, in Cambridge, the people there are paying commercial rents and they are paying for the service that Babraham can offer of very specific technical services which might not be found in other places. That is what they are paying for.

33. I do not doubt this is extremely good work, I am just wondering whether the taxpayer should be paying for it all?

(Professor Goodfellow) We are saying the taxpayer is not, in that companies are paying for services and our institutes are offering a service. There may have been a bit of money to set it up, they have development fund money, possibly through the local region or possibly from DTI for knowledge transfer/mentoring. Most of the money is coming in from these companies.

(Mr Young) I do not know whether it helps but the missions of the research councils are set out on page 17, that is the published mission normally set out in the Royal Charter of these three particular councils. The issues we are discussing is the extent to which they carry out that mission solely supported by public sector funds or whether they seek to supplement that with carefully managed commercialisation techniques, and that is what this Report is about. It and the Baker recommendations have encouraged us to go further in supplementing conventional public sector finance with commercialisation exploitation, and that is what we are trying to do whilst taking your point. The basic mission is set out on page 17.

34. Are there some commercial companies you would not work with, for example tobacco companies?

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(Dr Taylor) I think this is very much, again, a matter for the individual institutes and the individual research council processes. Their overall requirement is to operate something like the generic process, the diagram is on page 35, which says, first of all, choose publicly funded research topics in the public interest down the mainstream research agenda of your institute, and then we are enjoined by Baker and this Report to be opportunistic in understanding whether having done some research there may well be commercial opportunities and to run and police a process something along the lines of page 35, which hands off to the private sector and private funds just as quickly as possible and not to spend one more pound of public money in taking something to the point where private investment is willing to go with it.

35. I quite like Table 4 because it says "without trying to pick a winner too early".

(Dr Taylor) I would take a little more on ourselves than you would think. I think what we are asking the research institutes to do in the spirit of Baker and spirit of this Report is to make some choices, to focus very limited public funds which are available to take something to the threshold where it might be able to attract private investment, and to do that you have to make choices, you have to focus. If you spread it over every possibility you would not have much success.

36. You do not make ethical choices, if that is the right phrase, about tobacco companies, to use my example. Maybe Professor Radda would like to answer that, would the Medical Research Council welcome tobacco companies?

(Professor Sir George Radda) Ethical considerations will precede any commercial consideration. The Council will look at it very carefully and where there is an ethical issue they would not like allow commercialisation if they found there was something unethical or not right.

37. Do you do any work with tobacco companies?

(Professor Sir George Radda) We do not to my knowledge.

38. You personally would not wish to see that happening?

(Professor Sir George Radda) I personally would not wish to see that happen.

39. Could I just pick up on something that both the Chairman and Mr Williams touched on, the retention of key staff, and brain drain to America, and so on, Professor Radda was optimistic about the fact we are encouraging people back, however in the Report on page 23, paragraph 2.24 it says there you are confident your retention problems have been resolved. What were the retention problems that were resolved?

(Professor Sir George Radda) This is the retention of staff who are involved in our commercial activities, that refers to that. These are professional staff that we employ in MRC technology who having been trained to do a certain type of job in commercialisation are very open to offers from all sorts of sectors in the company. We have a salary structure within that because it has its own salary structure which is competitive on that basis.

40. You think you have now resolved that?

(Professor Sir George Radda) That problem has now been resolved.

41. Are they commercially competitive?

(Professor Sir George Radda) We have to offer commercially competitive salaries to get the sort of professional staff we need to do that work. This is not work for the scientist, this has to be done by professionals.

42. I know these are people who are experts in commercialisation. What about scientific researchers, give me an idea of the sums we are talking about? What is the highest amount money that a public researcher might be earning with all of incentives, and so on, in one of these areas?

(Professor Goodfellow) What level are you talking about, a director of an institute?

43. Or some leading researcher into antibodies?

(Professor Sir George Radda) I can answer that, in fact we have been able to negotiate with Treasury over the last two years a substantial increase to the salaries of all our scientific staff, particularly non-clinical scientific staff and we are now able to offer salaries, not only ones that are competitive but also salaries that reward people for outstanding science.

44. What is the highest salary, roughly?

(Professor Sir George Radda) A Director of one of our major laboratories would be earning £100,000.

45. How does that compare with a pharmacist?

(Professor Sir George Radda) It compares extremely well with the university sector, but it does not compare that well with the private sector. In terms of the academic salaries our salaries are now very competitive and we are able to appoint people at a level of salary that can compete with some of the best academic institutions round the world. Commercial salaries are quite different. (Professor Goodfellow) We have had to look very carefully at salaries and we have a specific Remuneration Committee chaired by the chairman of our Council. We look very carefully at salaries. We have just recruited somebody who came from California to head the John Innes Institute for Plant Research. There we did have to offer a higher than normal salary, and we are up to about £95,000, about the same order. If we want people with commercial experience, like this person had, we have to pay.

46. Is there a different kind of person who would instinctively go and work in a public research council, such as the ones you operate, compared to the kind of person, the kind of graduate who works for a big commercial company? Are you attracting different people here? Obviously because you are not offering the same salaries people must have a reason for going into public sector research, some reason other than the salary reason? Is the danger of this process that you are going to erode the difference but not keep track with the salaries and, therefore, people are not going to do this public-spirited research in the future?

(Professor Lawton) Given that a great deal of NERC science is science for the public good we do attract scientists who do it because they love doing

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[Mr Osborne Cont]

the science and they understand the aims are benefit to the public and not to make a profit. Most of the environment we live in has to be managed and the science we do helps to manage the environment more effectively. So, yes, scientists who come into my area of science do not come in to make a lot of money, that is absolutely true. Interestingly, the best scientists often also enjoy turning the science they have done into either research that somebody wants to commission, which is numbered three in Table 5. It is often positively correlated. The best scientists are often also the ones that turn out to be particularly good at spotting commercial opportunities.

47. Can I ask the other two heads of these research councils if that is their experience because it is a different kind of person who comes to work for you as opposed to working for a big private company, maybe even a tobacco company!

(Professor Goodfellow) I have just moved two months ago from the university sector where I was training graduate students and I would say there is not a particular difference. I think the ones that stay certainly in the university sector are absolutely driven by the science, they will go to an institute and they will be driven by plant science. That is what we are asking the institutes to work on commercially, we are not asking them to change to something completely different. The worry would be if they were in industry they would be moved between projects which they were not totally focussed on.

(Professor Sir George Radda) I have no doubt that the people who are going to do medical research in our institution want to do it partly because of the intense interest they have in the rather exciting science in the biomedical field at the moment and partly because they want to do something good for the public, which is our primary aim.

(Dr Taylor) If I can add a footnote, in my experience going round the different institutes and meeting different kinds of people I think a carefully managed amount of this kind of activity in the public research institute speaks to two important frustrations, one is the route to market for the things they are doing, they would like to see that the discovery, the invention, the innovation they have made can find its way to the public a little better than it would if we did not do this kind thing. They also get tremendous feedback from the people they interact with in that process, which informs the research they do and the new kind of research proposals they make. I think if carefully managed it is extremely positive.

Mr Jenkins

48. I am glad you came up that statement "carefully managed" because there is an ethos amongst some research scientists, they do want to work on science, they did not pick to go into a commercial environment and if you get too commercial they may as well go along and join one of the commercial associations. Forgive me if this is an easy question, but it is important for me to get it into my head, money kept by councils, Mr Young. If you allocate public monies—at one time I used to on

a much smaller scale, of course, I had to allocate it to different departments and if the department found they had a surplus I would not allow that department to keep that money, it had to come back to the centre, and the centre would allocate where its priorities were—I see we are going down the road of allowing councils to keep seed funds to select which particular projects they want to go with and that might not be the priority you want to go with. You have established a precedent now, what scale would you let it grow to before you start saying, enough is enough?

(Mr Young) It is not that straightforward a question, as I expect you probably realised. The Baker Report gave us some very specific recommendations that in order to try and maximise these commercialisation opportunities we have been talking about we needed to give research establishments, I am reading page 16, Figure 6, more control both of intellectual property and financial freedom. It was argued that if we just took back income which they got from commercialisation and did not allow them to spend it, just as if we did not allow any individual scientists at all to benefit from their inventions, we would not incentivise the sort of behaviour we wanted to encourage. We got the recommendation from Baker that, (a) we had to allow carefully managed incentivisation procedure for scientists and, (b) we should lift what you describe as the normal old-fashioned Treasury rule of annualised expenditure controls so that they could not spend any more, even though they earned more. What we have done now is, and it is described on page 34, 4.6, "The Government allows Research Councils and their Research Establishments to retain the receipts from commercialisation, to be shared between them as they see fit. The Treasury has changed its rules on budgeting annuality..." It then goes on to say, we are applying that flexibility and spending between years to the Research Councils. The justification for that is we want to incentivise them to get income in and we want them to feel that they benefit from that. If we just swiped it at the end of the year, in the way you remember, there would be no incentive for them to get it. That is justification. We have kept controls. I think we are a long way, away from that danger, but there is a power for us to stop it if gets beyond a certain percentage or becomes a risk.

49. That is the question? What is the percentage? What do you feel is the cutoff point, if you like?

(Mr Young) That would be in Treasury's hands.

(Dr Taylor) Of the order of five per cent is when we start paying serious attention to whether we need to take this further with Treasury, in the zero to five per cent bracket.²

50. The commercial returns to be utilised by the research council is excellent, up to five per cent, and then the principle kicks in?

² Note by Witness: Departments are allowed to retain receipts from activities under the Wider Markets Initiative up to a level equal to five per cent of their allocation. For receipts beyond this level they are required to consult with Treasury. Ref Ev 24, Appendix 1.

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(Dr Taylor) No, I said that is when we need to start consulting Treasury and others about particular cases.

51. It is a flexible friend?

(Mr Young) Yes. We have never had to restrict it yet, which is why I answered slightly—

52. You have never got to five per cent?

(Mr Young) That is right. That is why I say we are a long way away from this excessive spending danger which you are holding out to us.

53. Hopefully they are growing and they will get to a point where they will go past five per cent. I have no problem with that as long as I have an understanding of it. Our core scientific role, page 2, versus commercial, I notice that there is a risk assessment undertaken to ensure that we do maintain a core scientific role, yes?

(Mr Young) Yes.

54. How is it done? I want to be clear in my own head, how do you undertake this risk assessment? Who does it?

(Mr Young) The research councils do it. The risk assessment is roughly as in Figure 14 on page 35, that is the system roughly which people do and one of my colleagues will talk you through it.

(Dr Taylor) Let me preface it by saying, the vehicle for overseeing this is each councils annual operating plan, its annual report and its chief executive's objectives and his ability to satisfy those objectives. It is in that annual oversight process from OST that each of the councils gets looked at in terms of, is it achieving its core mission? Is the balance for what it is doing making sense? Is its audit committee satisfied that it is following the priorities that have been set out by the council?

55. You do it then?

(Dr Taylor) We oversee at that level.

(Professor Goodfellow) I cascade down to the institutes on rather an external review every four years in our institute, which is knowledge transfer, the quality of the science, strategic growth and interaction management and research programmes at the institute, which has outside reviews as well and which reports to my council. That is monitored yearly. Financially they are monitored every six months in terms of business plans.

56. Mr Young, do you feel happy with this?

(Mr Young) I most certainly do, because the whole point of this is to give the research councils maximum discretion and maximum freedom. If we centralise this that is where disaster lies, in my view. We appoint good people to the boards of research councils, we appoint excellent chief executives, of whom you have three very good examples here, and that is the best way to get the right decisions in this area. There is no way we can centralise this or lay one-size-fits-all rules.

57. Taking you on to individual benefits, one thing I did not ask is, in private or commercial research laboratories do researchers normally have a contract which allows them to benefit from their research work? Do you have any knowledge of this?

(Dr Taylor) Many companies have stock option schemes, which are usually awarded discretionary on how well the individuals perform. Very often stock option schemes on a discretionary basis are used to reward outstanding achievements by individuals. That, plus a much more flexible approach to salaries, is probably the way in which private sector researchers get compensated for individual success. There are also a set of things to do with team performance.

58. If this is the world we work and live in we have to attract people from that commercial world, I think we should know the complete deal rather than one in isolation. If people benefit from their work in the commercial facilities why should they not benefit when they come into the public sector?

(Dr Taylor) Did you say "should" or "should they not"?

59. Why should they not? I am trying to get both sides of the coin, it is not a trick question.

(Dr Taylor) The guidance that the OST put out last year about how these schemes might operate included the rather altruistic options for taking personal reward, it could come as increased research funding to the individual group, it is very flexible.

60. To manage individual benefit I think somebody said that we do risk assessment or risk management of this programme to make sure that the individual is not pursuing a path that will maximise the payer benefit rather than the acquisition of knowledge for the public sector. How is that doing?

(Professor Lawton) There are strict codes of practice that are in the public domain about how people have to behave and how they are expected to behave. Any decisions that are made about how much time or resource an individual will spend on their core research as opposed to the more commercial research has to be transparent and managed by a line manager. If it is one of the directors of the laboratory then the decisions on the conflict of interest would come on to my desk. The whole process is managed and looked after by a director for partnership and exploitation, and the finance director when significant sums of money are involved. It would be a very serious disciplinary offence if people were to ignore or ride roughshod over these things.

61. Are you happy with those?

(Mr Young) We set them guidance.

62. How do you monitor their arrangements?

(Mr Young) It is part of the regular discussions between the director general and each of the chief executives. Part of the chief executive's duty is to have arrangements which control and manage the process you are asking about.

63. Does your department have any facilities or staff to check these are in operation?

(Mr Young) We have documentation.

(Dr Taylor) My core staff in OST are engaged in essentially vetting and validating the annual reports that are made to us. They also attend each of the councils meetings and they listen to what the councils

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audit committees have to say. I think we have a pretty good, fairly leanly resourced, I have to say, but a fairly tight, central overview without trying to be centrally prescriptive. I think we can monitor and audit well.

64. Excellent. Who trains the managers to be more commercial with regard to intellectual property? Academics are not really commercial negotiators, who trains them? Who do you pick? What sort of individual do you pick to do this negotiation?

(Professor Sir George Radda) I think that the commercial activities in our case are run by a separate company of the MRC. It is like any company, the board will pick the CEO or the other various members who are appointed, and they are appointed on the basis of their professional qualifications for commercialisation activities, not necessarily their scientific excellence. We want to take away from the scientists this business, because we do not want to burden them with having to think about commercialisation. We want them to get on with their science. We want them to recognise that their activity can lead to commercial activity and we have people who know how to bring that about. We do train scientists regularly, recognising that their work would lead to commercialisation and we have that training through our MRC technology people largely, to all of our tenure track scientists and also the new post-docs. We train something like 150 people a year to recognise the opportunities that commercialisation can provide while carrying on with their scientific activities.

(Professor Goodfellow) We have a similar system of experts in our institute. We also have a director of innovation who has core central staff who sets up seminars, typically we are doing ten a year with possibly 50 people, so 500 a year. On our PhD training programme we require they do some awareness training.

(Dr Taylor) We recently set aside £1.5 million to provide additional academic training and courses for people in this kind of area because there is likely to be an increasing demand for these kind of people, we do need to train them.³

(Mr Ingram) We try and get interested in quite different experiments doing these things, plus we appoint four professional scouts, whose job it will be to seek out the generic intellectual property that we have as professional people to be able to do that.

65. The same question, really, risk assessment of the management of commercial projects, how would you undertake risk assessment to ensure that, (a) it is commercially viable and you are happy that it is policed and enforced properly?

(Professor Goodfellow) This is Table 14 on page 35, which is the generic risk management framework. This is the one that has come from a large pharmaceutical sector company. Our trained staff are using these type of procedures. We are employing

trained staff to transfer innovation and to take our scientists through this process.

(Professor Lawton) We also use professional advisers on interactions with venture capital and industry, and mentoring schemes and committee processes help us pick these. We have people who are well versed in these activities to make sure that we do not fall over one of those hurdles as you go through that process.

(Professor Goodfellow) We annually run an innovation competition, where as part of that people in our institute get training and are taken through the whole business plan process.

66. Mr Young, are you quite happy with the procedures?

(Mr Young) Lest that my colleagues are over-modest, what you are hearing about and what the report is bringing out is where there is effective leadership and where people have taken on board the messages from the Baker Report and the government's response to it we are seeing a complete shift both in the performance and the capacity of research councils, some start further up the learning curve than others. Over the last three or four years there has been a complete and total shift both in their capacity and in their willingness to do things differently.

67. You are quite happy with the way they are negotiating deals with commercial partners to secure the best deal for the taxpayer?

(Mr Young) It is a question of managing risks, not avoiding them altogether. It is our job to ensure they have the processes and the capabilities within their teams to do the best they can in this area. In this area, particularly with things like patent, it is not possible to avoid risk altogether and playing safe does not always avoid risk here. I am happy they have the systems and the capabilities in-house and in place to make this transformation which this Report records.

Mr Jenkins: My time is up.

Geraint Davies

68. Mr Young, you spend about £500 million on research and you make about £17.5 million in terms of private sector returns, across the three areas, 2.7, 12 and 2.45, something like that?

(Mr Young) I think that is right, I would have to check it.

69. Can I just ask, you keep all of that, is that right, to put back into research? Is there any evidence that the block grant is actually taken away with the other hand from the Treasury?

(Mr Young) No, there is not. The important concession that the Treasury made, after Baker, reported on page 34, was that they would not reduce it.

70. What is your ambition? If it reached £100 million do you believe that that would reduce the overall grants, and that actual global net amount of investment would go up and there would gradually be a claw-back?

(Mr Young) We are in an area of extreme hypothesis here, the amount of commercialisation

³ Note by Witness: £1.5m, set aside from a £120m funding package for knowledge transfer allocated by OST in October 2001, is intended to fund a range of activities that include professional development courses for knowledge transfer managers.

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will always be limited. In talking about the current retention agreement it is that research councils can retain five per cent of commercialisation income until it reaches five per cent of their spend. After it reaches five per cent of their spend they have to come back to us to ask permission to keep it.⁴

71. It is a progressive taxation situation?

(*Mr Young*) We have not said that. No one has got anywhere near this yet. The current rule is that 105 per cent spend is all they are allowed.

72. In terms of marginal income from the private sector to put into research is there a risk that there will be pressures on scientists to play ball with the private sector partner, wherever they are, or else research gets this type of thing?

(*Mr Young*) We have been very careful for our part in DTI and OUT not to allow that. We have said on the one hand of course you must exploit the commercialisation opportunities, which this report sets out, but we have always said that the core mission is the core mission is the core mission. That takes precedence. I think my colleagues will agree they have not had pressure from us to do something which they regard as contrary to the core mission.

73. In terms of the core mission it is a clarity of purpose, and you mentioned a whole range of indicators, and you did not choose, and I do not want you to, to wait and quantify how they all fit together. There is a whole range, like some sort of bureaucratic thing, where you think all these good things and say, we are measuring all of these things. Obviously in the private sector you only have one indicator, that would basically be the profit, would it not be a good idea to separate out these ventures and just focus in on the money?

(*Mr Young*) It is rather more complicated to have a core mission, the missions are set out on page 17, and to consider the extent to which activity which is commercialised goes towards that core mission or does not. It is rather more complicated.

74. May I turn to Professor Goodfellow to illustrate a point about possible conflicts between private sector market interests and the public sector in terms of income? Do we do much research with PPP in the area of GM foods?

(*Professor Goodfellow*) We do have interactions with them and there is a Bio-incubator which is starting at the John Innes Centre, in which we have money from Syngenta, which is going into that. If you want a discussion about GM technology you have to talk about, I think, at least three different levels. GM is not just one thing. You can do very basic GM in a laboratory, which is helping in a contained environment, which is helping you to understand something which is very basic and generic about plant size. Yes, we do work with these companies.

75. I am not going to lead you into an intellectual discussion where I will be completely out of my depth. Do you feel that given that, obviously, Spula have their own commercial interests in this science,

for instance they have an interest in allowing seeds to be classified as non-GM even though nearly 1 per cent of them are GM and they may not want a tightening up of that because it will lead to zoning, and all of the rest of it, and commercial impacts. Do you feel that in terms of constructing the research their commercial interests can have a tendency to distort where the research venture goes or where you look to do the research?

(*Professor Goodfellow*) We have just reviewed all of our eight institutes with external reviewers, with a mixture of academics, people through industry and overseas. One of the things is, are institutes doing the work of their core mission? I have anecdotal evidence from directors where they say they have turned down commercial contracts because it does not fit with their core mission. In terms of GM technology, this is clearly quite an interesting area at the moment, and one of the things we might well expect one of our institutes to work on is technology which would allow you to detect GM crops at the 1 per cent level, which is now possible.

76. Or below that?

(*Professor Goodfellow*) The problem is detecting it below. One of the public duties of our institutes would be to work, possibly with monies from another ministry, from DEFRA, to look for techniques for looking for GM below 1 per cent.

77. Some of that is just a question of how far seeds can fly in the wind?

(*Professor Lawton*) The environmental impact assessments are something that my research council does partly in collaboration with BBSRC. That is a classic example of public good science, that is largely funded by government, and a good example of heading number 3 in Table 5.

78. In this example, given that the government are doing farm-scale, commercial —

(*Professor Goodfellow*) They are our institutes—

(*Professor Lawton*) We do the research.

79. In terms of the interest to the industry and how quickly some of these results come out in terms of detection rate versus farm scale experiments and whether they have interests in different bits of experimentation proceeding at different times in line with decisions by government and that might distort what you do. You have not found that yet?

(*Professor Lawton*) The research we do is independent of both government and those companies. If we chose to do a piece of research that companies did not like there is nothing they can do about that.

80. We talked about poaching, do you find have you human capital coming in from the private sector, like Glaxo?

(*Professor Goodfellow*) Yes, we do.

81. Do you have examples of people coming in from these companies taking less money than they were in the private sector?

(*Professor Goodfellow*) I do not know enough details about their salaries.

82. Do you think there is a danger of them coming in and trying to distort priorities?

⁴ Ref footnote to Q 49; and Ev 24, Appendix 1.

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[Geraint Davies Cont]

(Professor Goodfellow) There are a very wide range of people that work in public sector bodies. I could not imagine one person coming to an institute with 800 people and distorting it.

Chairman: We are going to have a break for 10 minutes.

The Committee suspended from 17.49 to 17.57 for a Division in the House

Geraint Davies

83. Can I ask, is there any experience of the private sector paying for lots of lunches and days out to the public sector? I do not know if anybody has any experience of that or not?

(Mr Young) Have we been recipients of this generosity.

84. Yes?

(Mr Young) Speaking for myself, no.

85. Can I ask you something completely different. In terms of some of the partnerships, maybe I can ask Professor Radda this, if there is a relationship with a private sector partner who is interested in developing a drug, a kidney drug or whatever it is, is there a danger that that private sector partner will want to, as it were, delay overall access in knowledge that we have for competitive advantage and profiteering against the public interest, do you find that is a problem?

(Professor Sir George Radda) Perhaps I can answer that in a more general way. If you look at page 5 of the NAO Report is actually sets down correctly what our priorities are in our commercialisation activities. The first and the most important priority is to be able to make sure that the commercial arrangements are such that they provide the benefit, if you like, the welfare benefit to the public. That is our number one priority.

86. I appreciate that. If I was in the private sector and I said to you, I want to develop this drug, it helps various people but I want to have rights to use it through my company alone, or whatever, for the first few years to get my return?

(Professor Sir George Radda) That is clearly part of the negotiations of what is the best value and what is in the interest of the public. For example, there is a danger that a company would take on a licence or an IPR in order to stop producing that drug because they already have a product that is competitive, we would clearly try and not agree to such a process. We would want to have, if you like, that for the public benefit.

87. You are interested in the public benefit. In terms of the overall distribution of costs is there a danger here that the public sector take all of the fixed costs and then the marginal costs are paid for by the private sector and then the overall profitability, the great share is taken by the private sector and we are taken to the cleaner, to a certain extent?

(Professor Sir George Radda) We have to rely on the experts that we employ in negotiating those deals. We have examples where we have been offered £4 million up front to buy-out prospective product

royalties—I cannot repeat the company's name because it is commercially sensitive—for a vaccine against a respiratory virus and we said that is not good enough value, our people said that is not good enough, and we turned it down. We have now made more than £14 million from income otherwise.

88. You take a fixed cost but you take a share of profit over time?

(Professor Sir George Radda) It is very common.

89. In so far as you are motivated by maximising the financial return then the response of that from the private sector is to try and restrict the opportunities for competitive entry into that market to make money. There is a conflict between you maximising your income and the public interest and having widespread access to the drug we have just been talking about.

(Professor Sir George Radda) Maximising our income will not be our highest priority, our highest priority is to make sure that the product will be available for the public for a particular health treatment, that would be our number one priority. Maximising our income is the lowest of the priorities we have set down, as it is recognised in the NAO Report.

90. This company you were deal with £14 million, or whatever it was, and they turned round to you and said, we will give you £7 million and make it easier to get access, you would say, fair enough because my priority is not really about making money.

(Professor Sir George Radda) If you take an equity stake in a deal with a company, and both the scientists will have produced that, and also, if you like, you have a much better handle on how that is being exploited.

91. You mentioned earlier your ethical considerations are paramount and you would not deal with a cigarette manufacturer, if a cigarette manufacturer said to you they wanted you to work with them to produce healthier cigarettes would that not be in the public interest?

(Professor Sir George Radda) We have not been asked that question and it is hypothetical. I suspect our council will consider it extremely carefully. I am pretty sure that the council would look at it and decide what is in the public interest.

92. Very good answer. I have a general question about the cultural shift, obviously now the total income is a small share, 17.5 in broad terms. As that shifts is there a danger the scientific culture may shift away from the public good towards always looking for the next buck?

(Professor Sir George Radda) I hope not. If you like, the code of conduct which we have for scientists pretty clearly spells out where we have to have controls over that. What is important is the scientists themselves have recognised they could help the public by commercialising their activities. That is, I think, again the priority that we try to put on to our scientists.

93. Can I pursue another point you made about academics and the global market place, do you feel it is the case when you look at the number of academics

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[Geraint Davies Cont]

being attracted to British universities there is a much higher propensity for those people to come from abroad simply because home grown people do not feel they are being paid enough? A lot of those people are not coming from the United States at all, they are coming from Greece, or wherever it is, or the developing world. What we are in the business of doing now, inadvertently, of paying low wages, is asset stripping the developing world of academics and not attracting United States people. There is a big problem here.

(*Professor Sir George Radda*) I do not have the figures of how many academics are taken from developing countries. There is no doubt that in the United States a large number of the post-doctorate fellows and students come from China and India, I do not think that is the case in this country.

94. In terms of the balance of trade between us and the United States on academics, would I be right to say there is a massive imbalance and basically they are taking our people and we can recover a few of them, but we really do not have the financial punch to do that or is there a difference in what you do, as it were, and the university sector generally? I do not know whether Professor Goodfellow is in a position to answer this, having just come out of the university sector.

(*Professor Goodfellow*) There is a range of salaries people pay in the university sector. As we already said, Gareth Roberts is doing a report which we are waiting for, a report for Treasury, it is due out in April and we are all waiting to see what he is suggesting about the salary, the career structure for scientists and how many scientists and engineers we need in the United Kingdom. We are all waiting for that.

95. Professor Radda, on the medical side, in terms of the market needs, if the money is in cosmetic surgery rather than a low income return in terms of vaccines that will save lots of people's lives do you find there is this increasing pressure from the private sector towards profitable areas rather than public interest areas?

(*Professor Sir George Radda*) The market drives our research very little. Our research very often drives the products that are produced as a result from the research that we support. Most of our commercialisation activities actually have been driven by the science rather than the other way round.

Geraint Davies: It is push rather than pull!

Mr Gibb

96. On page 2 of the Report, paragraph 2 it says that one of the core roles is to train the next generation of research scientists. During this hearing you have heard phrases like, non-United Kingdom scientists, foreign PhD students, in many cases many of these people have been brought in from abroad, we have a deficit of people. I just wonder, it is not often we have three senior professors before us, starting with Professor Radda, whether you have any views of the British state education system?

(*Professor Sir George Radda*) In postgraduate, and we can talk about education afterwards, our own training budget in the last 10 years has increased by more than a factor of two. We now spend £40 million per annum on training and that is a very important component of our activities. If you are asking about the education system right down from schools up to there I can only express my private view—the MRC, as such, has no view on that—we do need to make sure that we can get more people into the sciences at the primary level of education and the secondary schools. Yes, that is a problem. We can advise and we can try and work with other people whose responsibility it is to see to that. It is, of course, not an MRC responsibility as such, we start with graduate education or postgraduate education onwards.

(*Professor Goodfellow*) We put about £24 million into training of PhD students in the United Kingdom. Our own studentships go to United Kingdom nationals. It is very difficult to get people from abroad on those studentships, so we are training United Kingdom people on them, and that is just over 2,000, and at least 700 of them are joint with industry as well, so they get some time in industry during that period as well. We are very keen to see greater numbers of people coming through the university sector. As my colleague has said, it is not part of our remit in BBSRC to affect the university sector, obviously we go in and we encourage both men and women to go into science.

97. I just wonder, Professor, whether coming recently out of university whether you have any views about the British education system at the secondary level?

(*Professor Goodfellow*) At the secondary level?

98. In helping you do your job, one of the core tasks of which is to train and educate the next generation of research scientists. Do you have any views, personal or otherwise about the British education system over the last 20 years?

Chairman

99. Not too long.

(*Professor Goodfellow*) I was going to say I have anecdotal evidence as I have two children, one of which is just doing her GCSEs but I do not think that is relevant to this Committee.

Mr Gibb

100. Professor Lawton, do you have any views of the British education system?

(*Professor Lawton*) I do but they are private views and I do not think my research council formally has views. I can tell you where my research councils issues are. We have a pool of about 1,000 PhD students, the biggest difficulty we have, and this does help to answer your question, is not in recruiting biologists and environmental scientists, that is relatively straightforward, we have considerable difficulties in recruiting sufficient numbers of adequately trained mathematicians, physicist and engineers into the environmental sciences and I

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suspect that is partly a reflection of the number of young people wishing to go into maths and physics at school and then into undergraduate degree courses.

101. It is a pity the three of you are not being a bit more explicit with your views because these things matter and this is an opportunity to change things. This Committee has quite a lot of influence, it is a pity you have not taken the opportunity.

(Professor Lawton) We could give you anecdotes, but that is not evidence-based.

102. You have been in this business of research councils for donkey's years, I would have thought you would have a well-formed and quite an informed opinion of the British state education system as a result of your work?

(Professor Lawton) We recruit very high quality graduates into our graduate programmes. We are not finding it difficult to recruit high quality United Kingdom graduates in general. We are finding it difficult to recruit adequate numbers of mathematicians, physicists and engineers and I said that I thought that was as a consequence of the shortage of young people we know nationally going into those as under-graduates.

(Professor Goodfellow) I would agree fully on this, it is the whole area of informatics what we call bio-informatics, because of the amount of data we are getting in, this is an area where we want to see more people and we do need to have more people trained in mathematics and the sciences. It is very important that there are robust structures for examination at A-level that people are taking maths at A-level.

Chairman: You are gradually warming up, Mr Gibb!

103. Do you believe there is no point in teaching knowledge to children and what matters is teaching them how to learn because knowledge is always changing. Is that your view of how your potential future research scientists should be taught and you should not teach knowledge at secondary and junior level?

(Professor Sir George Radda) I think you need a combination of knowledge and the ability of how to handle it. The real issue is now. I think that science is changing so rapidly that we need to get to the schools and say to them, you now need to teach science in a way that is more consistent with the modern approach, that is we are looking for people who can bring quantitative knowledge and quantitative thinking to science that was previously thought to be qualitative. We want mathematicians in biology. The system of education in this country and elsewhere in the world is not really ideal to generate this new sort of scientist. I think in our case, in the bio-medical field, we are going to need a lot more people who would have gone to pure physics also being able to think about biology. We need to look at the universities and at the schools level of how you can teach science that makes people excited about it and also able to look at it in a flexible way from different angles. That is my view about the sort of way that I would like if I had an influence on education, which I do not, I can express an opinion, and you asked for it, that would be my view.

104. That is very helpful indeed.

(Professor Goodfellow) This whole idea of enthusiasm for science, which I think people in biology are really feeling at the moment because of the whole change in technology that is coming through the sequencing and genomics programmes I am not sure we are getting through to school children. I am sure all of us at this table have given lectures in schools and we do promote these activities.

105. Do you believe that philosophy of teaching our children is not about teaching knowledge, because knowledge is always changing?

(Professor Goodfellow) They have to have some knowledge but they have to learn techniques. Learning how to do experiments I think that is very important for scientists, it does not matter what experiment they are doing but they can learn the way of testing hypothesis through experiments and that is taught in secondary school.

(Professor Lawton) I would echo those comments and simply add that the other extremely important thing to try and teach young scientists is for them to be able to say, I do not know, I do not understand that but I know how to find out.

106. Do you agree with the comment, you should not be teaching knowledge you should be teaching them how to learn?

(Professor Lawton) No, I do not. You can have beautiful thoughts if you do not know anything, many youngsters do. On the other hand you can be so bogged down by stuff in your head that you have not learned to think. Like all of these things, it is a question of teaching both.

Chairman: Those are very interesting answers. It is always the out of order questions and answers that are the most interesting!

107. Can I ask one final question. Do you think that when the state is engaged in research it should be confined solely to pure research and never to applied research?

(Professor Sir George Radda) I do not make a very strong distinction between pure research and applied research. The boundaries are not as defined as people think. Much of the research that the Medical Research Council does eventually is going to be applied; it is a question of what stage you do it. I think it is very important and the current government rightly recognises the importance of pure research, as you put it.

(Professor Goodfellow) We fund pure research across the applied side and we work in partnership with DEFRA on the applied side in agriculture.

108. You think it is right for the state to engage in applied research and not confine itself to pure research, which is the area of research that is least likely to be carried out by the private sector?

(Professor Goodfellow) I think we have to do both. The greatest success is when we see it going across from pure and applied, especially in the strategic areas and then taken up by industry.

(Professor Lawton) It also depends how you define "applied". A huge amount of the science that NERC and BBSRC and MRC does is science for the public

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good. It is science that as a nation we need to know. Try running a sensible economy without geological maps or tide tables, for example. The fact that people need to know that information does not mean to say it is second-class science that delivers the answer.

Mr Gibb: Thank you very much.

Chairman: Thank you, Mr Gibb, for that. David Rendel?

Mr Rendel

109. I would like to say, first of all, to Professor Lawton I was delighted to hear about the high quality of graduates going into NERC because 30 years ago NERC gave me a grant to go into research.

(Professor Lawton) Things have got distinctly better since then!

110. I think you have just turned me from one of the nice members of the Committee into one of the nasty members of the Committee! What I was going to ask just as an aside to begin with, which leads me into a different subject, is we used at that time to do quite a lot of research that was then used by the Met Office. When you are commercialising it, is it work that is necessarily done for a private company which is going to make private sector profit or could it be work done for other government agencies? Is that common?

(Professor Lawton) Absolutely. If we go back to the little Table 5 and look at line 3, NERC receives as commissioned research, predominantly from government departments, £26 million a year in money from government departments where they wish to know something about the environment that they cannot procure in any other way. That would include very substantial pieces of research on the atmosphere in terms of building into climate change models, but a whole gamut of other things that government departments wish to know. From our point of view it is one of the most important mechanisms that we have of turning basic science into (in this case) science for the public good, albeit somebody pays to have that research done—predominantly government departments.

111. Mr Young, on a more general basis it is true that the government research councils are selling their products to other government agencies? To what extent can that be really commercial? To what extent can you get the right price for that research?

(Mr Young) It is a difficult matter of judgment and negotiation is the general answer. It is a haggle. I do not know if John can help you further.

(Dr Taylor) As you may be aware, there is a major review going on with Treasury at the moment called the Cross-Cutting Review of Science and Research. Over the last three years we have installed in the university research sector a comprehensive system of tracking the costs of doing research and the results of that are in the public domain now. It has been very instructive to get universities to a situation where they can for the first time know what it costs them, for example, to accept a contract from a government department to do a piece of applied research. As part of this major review which is on-going right now, we are looking very fundamentally at the structures for

funding research in the universities, the so-called dual support system where part of the money for doing research in universities comes from funding councils, and the other parts come from the research councils that I am responsible for but also, increasingly, from the EU, from charities, from other government departments, from industry. It is becoming fairly clear following the Dearing Report and so on that certainly in universities there are fairly major funding gaps. There is a low price culture. There is an under-funding of the real full economic costs of accepting a research contract. I think you will find a lot of very active debate and discussion about this set of issues as we go through the summer and the cross-cutting review about what we really should be saying about the real costs of performing one of these research contracts. It is not a perfect market-place at the moment, I think it is fair to say.

112. I am glad to hear that you will look into it. It does sound like a bit of weakness in terms of how you do this commercialisation as a whole. I understand it in the private sector but this side of it seems to be weaker. Can I come back to Mr Young. Following on from something Mr Davies was asking, I do not quite understand some of the figures. You said there is £500 million being spent on scientific research with the various research councils, 83 establishments, of which 59 are in seven research councils—paragraph 1.

(Professor Goodfellow) In our institutes, not in the university sector.

113. Sentence two of the very first paragraph of the Report states: "Over £500 million of this in 1999-2000 funded research and research facilities in 83 public research establishments ... 59 of which are grouped together under seven research councils." That sounds as if the £500 million covers more than just the three research councils.

(Dr Taylor) Other government departments have other research institutes.

114. So how much of the £500 million is just the three here?

(Dr Taylor) It is about £450 million for the three research councils.

(Professor Goodfellow) We put £70 million recurrent into our eight institutes per annum.

115. My colleague has found the figure in paragraph 6—£443 million.

(Dr Taylor) It is about £450 million for these three.

116. So we must be getting fairly close to five per cent in some of them. I make the amount of money coming in—£15 million—five per cent of £340 million.

(Dr Taylor) Be careful because we are talking about various different numbers here. Sometimes they are talking about net profits from commercialisation activities and sometimes they are talking about the gross income from all forms of contract research. Some of these numbers include all of the money that for example government departments might have paid the Institute for Animal Health or the British Geological Survey for a piece of contract research and we do not count that

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as profit from commercialisation; it is gross income from commercial contracts.

117. So the figures given in 1.9 where we were talking up to £15 million altogether, that is just income not profit; is that what you are saying? Paragraph 1.9, if you total up the three figures between the three research councils it comes to £17 million.

(Professor Goodfellow) That is just from licensing and spin-outs. For instance, if you take the BBSRC figures, you have got £2.7 million, we have another £14 million which is coming in in direct industrial contracts, and then we have another £30 million coming in from government contracts under DEFRA.

118. I am getting more and more confused. The five per cent figure is profit not income? You are supposed to be under five per cent in terms of profit rather than income?

(Mr Young) The Treasury rule is set out on page 34 in paragraph 4.6. The Treasury would consider it consistent ... to have flexibility in spending between years, including the ability to carry forward surplus where there is good business justification. The Government has disavowed any intention to reduce funding support to commercially successful establishments ... It should generally be possible, therefore, to plough additional income from commercialisation back into research funding ...

119. I do not know if Treasury colleagues would like to give me the ruling

(Mr Glicksman) The Treasury guidance comes from a document called *Selling Government Services into Wider Markets* and it is a wider policy than just commercialisation of science. It is about the general wider market policy of government of which this is one part. The policy is that where annual receipts from wider market activities exceed five per cent of the relevant gross expenditure, departments should consult the Treasury.

120. What is the profit figure? I thought we were talking about the £17 million as the figure on which this five per cent was based. I thought you were saying earlier that £17 million was much less than five per cent of whatever the costs were. When you said it was well under five per cent, I am not clear what two figures you are comparing. You are obviously comparing something with £443 million.

(Mr Young) My understanding of the Treasury rules is that it is the net figure surplus income over expenditure which we are allowed to offset up to five per cent.

121. And what is that for the three councils?

(Mr Young) That I have not got.

122. You know it is much less than five per cent?

(Mr Young) Yes.

123. Perhaps we can have that in a note. It does not sound as if we can get much further on it today.

(Mr Young) Of course.⁵

124. There is an interesting paragraph—paragraph 4.20 on page 38—saying it is not always easy to find a sufficient array of possible partners to inveigle in for the bidding process to get the best deal. Mr Young—or maybe somebody else—how often is the commercialisation of technology done by selling to a foreign company? I can understand that you want to sell it internally because that is good for jobs and everything else, but it may be there is not a company in this country that can use it but you might nevertheless get some cash for it if you sell it abroad. Does that happen?

(Mr Young) I do not know the answer to that question, John?

(Professor Sir George Radda) It does happen in licensing. If it is a non-exclusive licence many of them will be taken up. Again it is important to remember that some of the companies that we have set up, equally, buy in from activities outside the UK. There is movement both ways. We have an example in the Cambridge Antibody Technology involved in work originally funded by NIH.

125. I am not worried about this. On the whole it is a good thing if you cannot find anyone to buy it in this country.

(Professor Sir George Radda) The answer is yes we have arrangements with companies who take licences out which is generating income in this country?

126. Do you have any idea about what sort of percentage of the profit we have just been talking about would come in just by selling licences outside the country?

(Professor Sir George Radda) I do not have that figure offhand but we can certainly supply that figure to you.⁶

127. It would be interesting to see how much profit is gained by selling outside the country. There have been a number of cases recently where commercial enterprises have found some time later on in their life cycle that they have very big liabilities, particularly companies like asbestos companies and tobacco companies which many years later find they are suffering from big liabilities. When that happens and huge damages are awarded, very often we find companies in danger of going bankrupt and being unable to fulfil their liabilities. To what extent does the public have an assurance (with the money that is being earned by companies which are spin-off companies from research done in this country) if that were later to go badly wrong and those companies were to have huge liabilities, that they will be able to be recompensed in some way? Are these companies properly insured against those sorts of liabilities?

(Mr Young) The position is that we collect annually contingent liability summaries from each of the research councils and report them to the Treasury in the usual way. Where commercialisation has taken place sometimes the liability is passed on, as I understand it, to the company with whom we are working. So in commercialised deals often we have

⁶ Note by Witness: In 2000–01 out of a total income of £17,946 million derived from commercialisation of MRC intellectual property, 64 per cent came from UK companies and 36 per cent from elsewhere.

⁵ Ev 24, Appendix 1.

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shifted the liability to somebody else. Where it is not commercialised we keep the liability and we, the DTI, collect them from research councils and publish them to the Treasury annually.

128. In that case the liability presumably remains with the public purse and therefore the public should have some assurance that they are covered. I am thinking more in terms of the spin-off companies or companies where you have sold or licensed research results outside. What guarantee can you give the public that such companies are properly covered by insurance for any liabilities at a later time?

(*Professor Sir George Radda*) The position is no different for spin-off companies than to any other company in the private sector. They will carry the liabilities.

129. What assurance do you have that they have properly covered any potential liabilities they might have in the future? Do you not bother with that? Do you just leave it up to them?

(*Mr Young*) "Not bother" is harsh but we have shifted the liability to them and it is not our responsibility to ensure that they have sorted it. Where it is commercialised, spin-off or anything like that, the liability leaves us and goes to them and we close the case.

(*Dr Taylor*) This is risk sharing with the private sector.

130. If I were somebody who had suffered from something which was a result of government-funded research which then went off into a spin-off company set up, effectively, by the government in the private sector, and later I found that that company had not been properly insured and could not recompense me for any liability it had, I would feel fairly angry that the public sector had not looked after my interests properly. I would have thought the government had at least a moral duty to make sure that such companies, particularly spin-off companies funded originally by the government, had properly insured themselves.

(*Professor Lawton*) It is a very interesting argument. Far more of the knowledge that we generate will be picked up by commercial activities or other government departments or elsewhere over which we have absolutely no control, and that is a huge uptake of our science. If somebody could show that the science was in some way deeply flawed and dishonest then there may be liability back on us, but that is extremely unlikely to happen and the particular example you are picking is such a small part of the way in which the science we do gets translated into goods, products and services. If it were an issue, I would be much more worried about the bulk of what we do than the rather small issue of spin-out companies where we transfer the liability and we know we have transferred the liability.

131. I think, Dr Taylor, it was you who said earlier that a lot of technology transfer is on the hoof. You have been asked a bit about the brain drain and so on and the difficulty of people moving abroad and people not working in this country when they have been trained in this country. I was interested in the possibility that people might start working in this

country, perhaps in one of these areas, and then transfer that knowledge abroad after a while. To what extent are we sure that we are not losing the value of our research as well as the people who are doing it in the brain drain? Can we control the intellectual property rights?

(*Dr Taylor*) In all honesty, this is an area where there is not the practicability of control. This is where one is in competition for the best talent. One of the most important things that my Chief Executives do is excellent research. We measure them on world-class excellence in what they do. The on-going remedy for the situation you describe is we should maintain what we do here as being as excellent as anywhere in the world. That is a continuing battle and a continuing challenge. Sometimes we will lose; sometimes we will win.

132. You are saying that if somebody does some research in this country, and gets to the point where it is nearly commercial and then moves abroad, you have no control over the fact you have then lost the value of that research?

(*Dr Taylor*) In general it is very difficult to make somebody in an open research environment sign undertakings of the kind that you might have in the commercial environment binding themselves not to go and work for a competitor for X years. That is not something which is practicable for us to do in any of the research environments we have.

133. I am not quite sure why not if you think it is practicable in a commercial environment.

(*Professor Lawton*) One reason it is not practical is because about half the research my council funds is in the universities and the intellectual property is transferred to the university and always has been. One cannot have any control over what happens to people in those kinds of institutions. If you look at the broader picture, some of the things we were talking about earlier which are alluded to in the Report—the need to allow scientists in our research establishments to have shares in equity, the rewards to inventors schemes and so on—show that if one were excessively restrictive in the way that one dealt with those people that would be a sure-fire way of getting them to move somewhere else. I believe it is much better to provide people with a good environment, with the encouragement to do excellent science, to commercialise it where that is appropriate, and in the best kind of labs. That is a great incentive to get them to stay. I do not think rules would make people stay at all.

(*Professor Sir George Radda*) Can I just say there is a bit of confusion here between what happens in universities and what happens in our own institutes and units. For example, the MRC holds the intellectual property on all research done in our institutes by our own staff. If the staff member decides to leave, the IPR of that research done under our support will remain with us. What we cannot of course prevent people doing is changing their job and taking some of their thoughts with them. There is no legislation against that.

Chairman: Thank you, Mr Rendel. Barry Gardiner?

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Mr Gardiner

134. Chairman, I think Mr Young will agree with me we have seen a lot of presumptions from politicians over the years, but I think there could be little more presumptuous than examining this August body on their own theses. I just hope that I am a kindlier examiner than my own committee was many years ago! Can I start by referring to section 4.9 of the Report. In general the Comptroller and Auditor General complains that people who appear before this Committee embark on ventures rather reckless of risks, but in paragraph 4.9 it says: "Research establishments are generally limiting the initial risks to the public sector, however, by selecting commercialisation vehicles—either licensing or limited liability companies—that place the funding burden on the private sector and so reduce their potential exposure in the event of failure in exchange for accepting lower rewards." The criticism here appears to be the other way to the one that we are used to in that you are rather too risk averse. Dr Taylor, is that a criticism that on behalf of the institutes you would accept?

(Dr Taylor) I do not think I would read the criticism in that way. I think what is being said here is a comment on the way in which we are trying to loosen up institutes to do the things that we are asking them to do and, remember, I think it says very clearly elsewhere in the Report, that what we are trying to achieve here is knowledge transfer to the wider economy and the actual pay-back to the institution itself that did the work in terms of income is not a priority for what is going on. Very clearly it says again in the Science and Innovation White Paper that the Government's policy in knowledge transfer from this publicly-funded research is to the wider economy. The concern is to get jobs created and business activity going and so on in the UK. We should put that as our number one priority and the specific returns to the funds of a particular institution should be very much a secondary consideration. In that sense one of the things that we are encouraged to do, and we are moving people to do, is to move things into the private sector where the private sector can accept the risks, invest and develop, to that get a wider benefit into the economy as quickly as we reasonably can rather than holding it back worrying too much about the particular returns to the particular establishments. For example, if you look at the Medical Research Council, the rate of job creation in the wider economy as a result of the kind of activities that they have been doing is really quite impressive.

135. In paragraph 4.10 it says that currently decisions on the form of commercialisation are largely devolved to the individual judgment of the team leader and the commercialisation officer within each of the councils. Do you believe that there is a danger that because this is deemed to be the job of the commercialisation officer, the importance of commercialisation is not one that is generally accepted as part of the team's objectives but it is something that can be left to the commercialisation officer?

(Dr Taylor) Again, I do not think that is the spirit of what we have or what goes on. I think it is very important, first and foremost, to go back to a comment made earlier that we want the very best scientists to be doing the very best science, and that is where we start from. Secondly, we do not want to put them into conflict of interest situations where they and only they are involved in determining commercialisation routes. This is bringing in somebody else who knows much more about that process, which is really important, and then using limited resources to get additional expert help, for example on IPR, for example on making partnerships, for example on looking at market opportunities, which are things which you would not expect to find resident in a particular research team just waiting to be asked to do something. You would expect to find those on a broader basis, either inside a much larger pool of people or available on contract when required. This is bringing in people with additional skills, talents, know-how at the right time to do it and that is the way in which we are certainly encouraging people to do it.

136. In fact the Report criticises the fact that commercialisation officers are not often required formally to explain their judgments to the management body along the lines of an investment committee.

(Professor Sir George Radda) If you look at the last two lines of that paragraph, it refers to the fact that in the Medical Research Council, strategic decisions are referred to the board of management of MRCT and also to the Medical Research Council itself so that in fact the day-to-day operations clearly are in the hands of the Chief Executive of Medical Research Technology. The major strategic decisions certainly go to the board of management of the company as well as the council itself and that officer is also part of the senior management group in the MRC, which meets twice a week under my Chairmanship and looks at all these issues as a matter of fact.

137. I am glad it is not a criticism therefore that applies to the MRC. I take that as case of special pleading in the Report and we therefore must address the other two bodies. I see you shaking your head.

(Dr Taylor) We are moving very, very rapidly in the right direction.

(Professor Goodfellow) Of course we have things in place. Certainly if it were something like setting up a holding company or a new spin-out, the director of the institute and the senior management team would be on board. Our institutes are independent, they have their own governing boards and their own Audit Committees which will be looking at the whole of risk management and assessing it. We also have clearly stated rules about at what level they have to bring it up to myself and my business innovation officer and my director of innovation and director of finance for approval by the BBSRC. So I think there are checks and balances in there.

(Professor Lawton) Things have moved on quite a long way, as BBSRC said, from what was said in the Report. We have just appointed four exploitation scouts whose job it is to take a strategic view across

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the whole of the NERC portfolio with different areas of expertise and to encourage generic technologies/platform technologies and the development of, for want of a better word, more joined-up thinking among different parts of the organisation. They are in place now. I believe they will make a very big difference to the long-term development of spin-outs and so on. Then we also have, as indeed all the other councils do now, business plan competitions. We do this together. Again, we bring in people with commercial venture capital expertise in helping us to develop those and so on.

138. Sure. What I understand from the three responses, therefore, is that whilst this may have been the case in the past in certain of the institutes, it is no longer the case in any of them and, therefore, the question comes back to you, Mr Young, why was it the case?

(Mr Young) It was early days. I have been trying to describe a complete change in climate over the last three years in this area pushed on by the Baker Report and the Government's response to it. Your questioning is rightly designed to tease out whether there is a minority of peculiar people that look at commercialisation opportunities or whether it is now wider in research council communities. We are doing our bit to ensure that it is the latter and not the former. So, for example, Partnerships UK has set up its own science and technology commercialisation unit and has issued guidance last September to all research councils. We ourselves have run a series of seminars, which the Report rightly praises, culminating just now, covering all aspects of commercialisation so what we are describing to you is a complete difference in climate suffusing the whole of the research council community and by no means restricted to just some experts.

139. I am always delighted to know that a report has been taken on board and that agreed recommendations have been implemented, I hope that goes without saying, but of course you will appreciate that part of this Committee's role is to understand why things have gone wrong and what I am asking you is not how you have put them right but how it was that they were wrong in the first place?

(Mr Young) I do not think the Report says anything went wrong. What the Report tracks is an emerging consensus around about the opportunities from commercialisation which were not there before.

140. "While carrying out this examination we did not find an example of a formal risk assessment in a commercialisation project." I take that as a criticism. It is a criticism which I want you to explain. I am quite happy for you to say things have changed since then but I do want you to explain why that criticism was an appropriate criticism—this is, after all, an agreed report—at the time and to explain how that was able to be the case?

(Mr Young) My understanding is, and my research council colleagues will say whether this is right or wrong, that there certainly were risk assessment processes in all research councils including these three at the time the Report was written. "Formal risk assessment" is a particular form of words. All these three research councils will have had guidance in place

on assessing the risks of projects and they will give you examples and we can show you the texts of those. I do not think the Report was saying that.

141. In that case, Mr Young, what was it that you were agreeing to when you agreed that sentence in this Report? You are telling me that it cannot possibly be what I assume it meant so what was it that you were agreeing to when you agreed that sentence?

(Mr Young) I do not challenge the statement in the Report. What I am saying is that there were robust risk assessment processes in all the research councils. Some of them have been changed since, some of them may not have been.

142. I take it then that the distinction you make here is the word "robust" for the word "formal"?

(Mr Young) Yes, I think so.

143. What you are saying is that there were robust risk assessment processes but there was no formal risk assessment process?

(Mr Young) As defined in this particular way and as instanced in table 14, but all the research councils were carrying out then and are carrying out now risk assessments similar to the generic description in table 14.

144. Would you accept that in any risk assessment one of the most important things that one can do is to formalise the process of risk assessment? If you do not have a formal process, it may be that you have a robust process, but I would have thought that with the panel of scientists sitting next to you the importance of making that a formal process that one goes through to check off would have been rather apparent?

(Mr Young) I do not believe the Report itself makes recommendations about the risk assessment.

145. What it does is show a model of good practice which it highlights in Appendix 4.

(Mr Young) That is right. Research councils—and the Chief Executives will say whether it is right or wrong—had all got systems of assessing risk similar to the generic description in table 14.

(Dr Taylor) My reading of this is an emergence of a volume of opportunities over a period of time and I think when they are saying they did not find an example of a formal risk assessment, I read that as meaning a generic, uniform process across a whole council. In the days being talked about here the volumes of cases and activities and so on was probably not sufficient to justify the laying down of a single, generic, formal process right across a council. That does not mean in my understanding that the processes that were carried out case-by-case as opportunities emerged were not robust and rigorous and scrutinised by the council and its Audit Committee and the people involved in managing the institute. I read this as a move towards a much more systematic, organisation-wide, generic, formal process justified by the fact that the volume of opportunities presenting themselves is much greater than it was in the case of two councils here.

(Professor Lawton) A specific example may help you. I have been in post for two and a half years and when I came in we did not have an innovation fund at all, we were struggling with one spin-out company, and that was as far as my council had got and therefore

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[Continued]

[Mr Gardiner Cont]

we did not have a formal approach to risk assessment because we were not doing very much of that kind of activity. When the evidence for parts of this Report were taken we were in the early stages of putting that right. Now we have an innovation fund, now we have a whole series of other activities, we have seven spin-outs, we have been learning by the process. Yes, we do have a series of formal and robust processes that allow myself, my council and my Audit Committee to be confident that we are not exposing the council or the public purse to undue risk.

146. I am out of time so, Mr Young could you finally therefore assure us that there are now in place uniform, formal and robust processes throughout all the organisations, because I took that to be a criticism of what had been the case in the past?

(Mr Young) Yes I can and I did not take it to be a criticism. I think the explanation has now been given better than I gave it, that the snapshot at the time was at a time when formal risk assessment procedures were not seen as necessary for some research councils because it was such early days in the commercialisation history. Now all councils have a formal risk assessment procedure.

Mr Gardiner: Thank you.

Chairman: Thank you, Mr Gardiner. The last questioner is Richard Bacon.

Mr Bacon

147. Mr Young, you just said that the Report does not make formal recommendations about risk assessment, which I think is right, but of course the Baker Report did in August 1999. In paragraph 1.17 it said: "Public sector research establishments should not have to live in fear of punishment for failure after an event but, rather, be obliged to have proper risk management systems before the event."

(Mr Young) That was in August 1999. This report was only published in February of this year. I go back to the sentence that Mr Gardiner quoted: "We did not find an example of a formal risk assessment in a commercial project." Not one. Ms Leahy, is that correct, that you mean there was not one formal risk assessment in the various projects at which you looked?

(Ms Leahy) Yes, that is right and we did not see a model of this sort in use when we looked at projects.

148. Can I ask you what you meant by including that sentence?

(Ms Leahy) We put this illustrative gate system in the Report. We took it from the literature and we thought it was useful and we had not seen it being used in the ones we looked at. There were obviously risk assessment procedures in place, but we did not see this particular model or a particular model.

Mr Bacon: You did not see a formal risk assessment model in use anywhere? May I ask were you writing into that sentence a degree of criticism?

Chairman: You may ask it but the answer will have to wait. I apologise. We will have a ten-minute break.

The Committee suspended from 18.54 to 19.03 for a division in the House.

Chairman: We are quorate.

Mr Bacon

149. I must say Mr Young's comments left me at a bit of loss. If everything is rosy and there has been a complete sea change in climate since Baker I am at a loss to see why the NAO write this in paragraph 4.11. The NAO wrote in paragraph 4.8: "Although Research Establishments are assessing the risks associated with commercialisation projects they have not yet developed a structured approach", and at the top of 4.11: "Formally considering the risks and opportunities before a project enters each successive stage of development will help to safeguard value for money and the public interest." When we go back to Baker which was three years ago we see: "The PSREs—the public sector research establishments—should have proper risk management systems." Three years later the NAO is signalling things are not all rosy. Is that a fair summary?

(Ms Leahy) We certainly thought risks were being assessed in a robust way on the deals that we looked at. As volumes were building up we felt a more systematic and formal approach would be useful but we felt that their commercialisation work was evolving in such a way that it did merit the formal procedures in advance that everybody knew about rather than having to look and see what other people had done. We were not implying that risks were being handled badly at that time but that they could be improved.

150. There could be improvements by making it more formal?

(Ms Leahy) Partly as we say because the number of deals had increased and did seem to justify this sort of system.

151. Thank you very much for that. Mr Young, if I could ask you about targets and objectives. Once again Baker said in paragraph 1.19: "Public sector research establishment chief executives should develop performance measures and targets against which their knowledge transfer efforts can be assessed." If you then turn to the NAO Report in paragraph 2.6 it says: "The Office of Science and Technology, Research Councils and Research Establishments need to further develop objectives and targets to provide an effective incentive to encourage commercialisation." Would you like to comment on that. Once again, Baker said you should be doing more about targets and objectives, three years later it appears that there is a criticism that not enough has been done.

(Mr Young) The recommendation is that we work further on the indicators and I certainly accept that and of course we are doing just exactly that. What the Report brings out rather well is the various sorts of activity which come under the commercialisation heading and I refer again to table 5 on page 15. What we are setting in place is a whole system of performance indicators to show progress by each research council which are very, very different from the one-size-fits-all in this commercialisation area. Some will do much more licensing, some will do more joint ventures, others will deal with patents and therefore spin-out companies may or may not be a fair measure. So what we have done is work out with the research councils key indicators of progress. I listed

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[Mr Bacon Cont]

them earlier and I do not suppose you want me to read them out again.

152. Not at all. I have not got very long. Ms Leahy, is the effect of 2.6 that you are not completely satisfied with what is being done?

(Ms Leahy) It is a very difficult area. We thought very hard ourselves to see if we could try and add value in any targets that might be set. I certainly agree with the need to look at a range of targets.

153. But you did include a sentence that more should be being done?

(Ms Leahy) Yes and my understanding is that people are trying to think hard about how to develop better targets. It is difficult but we do believe that further work should be done on it. My understanding is that we really are trying very hard to try and develop that and we are very pleased to see that.

154. Can I ask you about valuation of intellectual property rights. It says in paragraph 4.18 on page 37: "The evidence available to us in the course of this examination suggests that there is little formal assessment of the value of the intellectual property involved. There is therefore a risk that the public sector will tend to accept the private sector's valuation..." Mr Young, would you like to comment on that?

(Mr Young) This is a key area. What we have done is issue guidance in December 2001 prepared by the Patent Office which said precisely the formal processes that the research councils should go through. I hope they found it useful. Certainly it is a key area for them to get right, but it is potentially very, very difficult.

155. I would like to clarify the numbers we are talking about here, rather like Mr Davies and Mr Rendel. Professor Goodfellow, can you tell me what the total BBSRC budget is?

(Professor Goodfellow) Approximately £250 million and that goes to universities and institutes.

156. I understand and the MRC budget, Sir George?

(Professor Sir George Radda) £360 million approximately.

157. And the NERC?

(Professor Lawton) £200 million.

158. Mr Young, the EPSRC, which is the biggest council, has been excluded from this. Is that because it does not have any research institutes of its own?

(Professor Lawton) The NAO chose which ones to look at.

159. Was that why?

(Ms Leahy) They have very few research establishments compared to the ones that we looked at. I am not sure if it is one, two or three but it is of that order, I believe, and the majority of the spending seemed to be on equipment.

160. Really?

(Ms Leahy) So we felt that the lessons we could get from looking at these three research councils (as we had to focus our Report) were probably the key.

161. I looked up the figures for all the research councils and mine are slightly lower. The equivalent for the EPSRC was £427 million and £19 million went

on equipment. That leaves over £400 million that is not on equipment.

(Ms Leahy) I certainly would have to look at our figures again.

162. This is a document called the *Allocation of the Science Budget 1999-2002*, a booklet published by Mr Mandelson when he was Secretary of State. The numbers could be completely wrong but I assume they are accurate. Research council area, EPSRC—equipment funding £19 million; BBSRC—equipment funding £5.7 million.

(Dr Taylor) The important thing about the EPSRC is that almost all its money flows to university research groups. It has virtually nothing that you could recognise as an institute. I think the NAO quite rightly, in calling a judgment, are saying there is very little to be learned from studying equipment. From this point of view they do not have research institutes or major institutes.

163. What, if anything, has NAO done to look at the way the EPSRC funds delivering the commercialisation of their part of public sector science, because they have a lot of programmes that have commercial application, do they not?

(Ms Leahy) We focused on just the three research councils that are represented here and we thought the different type of activities they carried out and the different sorts of markets they were in would allow us to maximise the chances of learning useful lessons and we did not look at the EPSRC.

(Dr Taylor) It is fair to say that you did not look at the university part of what these three councils do either, only the research.

164. Professor Goodfellow, I wrote it down when you said in addition to the £2.7 million mentioned on page—

(Professor Goodfellow) 1.9 on page 14.

165. You had £14 million of consultancy income and then another £30 million of something else, I am not quite sure what.

(Professor Goodfellow) The numbers here in 1.9 we are looking at £2.7 which, I agree, is sales of equity in spin-out companies and licensing of royalties. We have another £14 million from research contracts with industry, and I do mean industry, and we have a further almost £30 million with DEFRA. We also have inter-actions with the Food Standards Agency as well.

166. It is 46.

(Professor Goodfellow) We would not count that as commercial; it is industrial.

167. Including licensing, royalties, consultancy income, what is your total commercial income?

(Professor Goodfellow) We call it £16.7 million. £2.7 plus £14 million and we put in £70 million recurrent to the institutes.

168. Are you sure you are doing that correctly? Presumably there are contracts that DEFRA places with you which they could place with other laboratories elsewhere in the world or in the private sector possibly?

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[Mr Bacon Cont]

(*Professor Goodfellow*) Of course. It is all competitive and our institutes have to win in competition.

169. Arguably it is commercial, it is hard charging?
 (*Professor Goodfellow*) It is competitive and certain of the grants, depending on the type of DEFRA grants, have almost full economic cost. Some of the others do not but basically you could add another £30 million.

170. If you include the whole lot, it is basically 46.
 (*Professor Goodfellow*) It depends how you like to add the numbers up. I think we have to be careful whether we are working for another government department or whether it is with the private sector.

171. The NAO does work for various governments around the world and presumably that is counted as commercial income?

(*Sir John Bourn*) It comes in as appropriations in aid, yes, and it has to be run competitively.

172. I accept there are labelling issues but other than the money you get from central government grant, depending how you call it, there is potentially between £40 and £50 million of other consultancy income, be it from government or private sector?

(*Professor Goodfellow*) Yes.

173. Professor Lawton, how much is your number?

(*Professor Lawton*) We receive £26 million in round terms for commissioned research. 75 per cent of that is from government departments, therefore, the other 25 per cent, about £5 million or £6 million, is from industry. We receive £4 million in European Union grants and we receive the £2.45 million that you have down under paragraph 1.9, page 15.

174. Sir George, would you mind saying what is your total for MRC?

(*Professor Sir George Radda*) If you just take our royalties from licensing agreements, in 1998-99 that was nearly £3 million. In 1999-2000 it was £7.5 million and in 2000-2001 it was £17.9 million, nearly £18 million. That was just from licensing income. In addition to that we have industrial collaborations and they amount to just under £10 million per annum.⁷

175. Thank you very much. Mr Young, is there any way that you as the DTI can assess what level of receipt would represent a good return?

(*Mr Young*) No, not in a one-size-fits-all way method. There is no formal process which will get an easy answer. What we do do is meet regularly the Chief Executives and set them personal objectives. We compare them over time and we look at the different ways in which they could be maximising commercialisation. Remember, receipts are not the only indicator. What we need is a menu of indicators to discuss on a sensible basis year-by-year-by-year with each research council what they are doing and that is what we do.

176. Presumably you do accept the statement in para 2.6 that more should be done or can be done to develop further objectives and targets?

(*Mr Young*) I certainly do and we are working up new performance indicators currently.

Mr Bacon: Chairman, no further questions.

Chairman

177. Thank you very much. Just a couple of questions to wrap up. Do you take a strategic approach, Mr Young, across a portfolio of projects or do you take a case-by-case approach as set out in paragraph 4.10 on page 35?

(*Mr Young*) What we do is we ask each research council to produce a formal risk assessment process which we discuss with them, so we clear the generic form of risk assessment which they are applying and leave it to them to do the case-by-case risk assessment.

178. Sir George, you mentioned that you had taken on somebody who was an expert from America in stem cell research. I do not want to get involved in all this debate but it occurs to me to ask this question. There has been a lot of debate about this subject that perhaps it is driven by commercialisation. There are huge commercial rewards if this works well. Vast advances in medical science could be achieved and some people are saying that is what is motivating this whole thing and that it what has motivated the debate between embryo research and adult stem cell research. To what extent can you cut yourself off from the difficult ethical arguments? You mentioned the ethical debate earlier and there you have got a particular issue where medical science is involved and there is a fierce ethical debate raging and huge commercial interests. Just give me a feel about how you are feeling your way through this difficult moral maze.

(*Professor Sir George Radda*) The number one consideration is that the opportunities of using stem cells to perform new forms of therapy are enormous and we can certainly think about the diseases where it could well be applicable. I do not believe at the moment that many of the major commercial organisations are expressing a terrible interest because they do not know how exploitable it is going to be. The major issues are scientific and clinical opportunities and ethical issues. The ethical issues have been addressed by appropriate groups of people like the House of Lords' Select committee. In fact, both Houses of Parliament have looked very clearly at the ethical issues. We have provided information to people about what the scientific opportunities would be. I do not think that the debate currently is really driven by commercial considerations. It is a long way down the road before this can be commercialised, in my view, because there is a great deal of fundamental biology to be done to understand the behaviour of stem cells derived from embryos and those derived from adult cells. Until we understand that we do not know what the commercial possibilities are. Clinical treatment is five or ten years down the line and that is when you begin to see what the commercial side might be.

179. If you are looking at the difference between research based on adult stem cells and embryos, adult

⁷ Note by Witness: On checking, the income to MRC in 2000-01 from contracts with government departments and commercial collaborations was £13.3 million, not including research contract and collaboration income to MRC Technology.

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is going to be far more difficult apparently and therefore less prone to commercialisation. Is that a motivator in your work or not?

(*Professor Sir George Radda*) Not that they are less prone to commercialisation. There is much less scientific knowledge about the way that you can reprogramme an adult cell to produce tissues of all the different kinds that you would like to produce in this study. There is a difference in the biology in the way that the adult cells can become kidney cells or brain cells compared to the biology of a cell derived from an embryo. I do not believe that any of the arguments that we have put forward were driven by commercial

considerations in this instance but instead are driven entirely by scientific and clinical considerations.

Chairman: Thank you for that. I hope my colleagues will forgive me for asking a couple of questions. May I thank you, ladies and gentlemen, for some very interesting evidence. We have had a very distinguished panel in front of us and we have found it extremely informative. Thank you for coming here this evening. We pay tribute to you and your staff for being such a beacon of excellence in terms of world-class research. We salute your work. Thank you very much.

APPENDIX 1

Supplementary memorandum submitted by HM Treasury

HM Treasury Guidance: Selling Government Services into Wider Markets

BACKGROUND

1. This note sets out the circumstances under which the Treasury would expect to be consulted regarding the levels of receipts from wider markets activities. As Mr Glicksman said in answer to Q119, the Treasury guidance is contained in a document entitled *Selling Government Services into Wider Markets*,¹ issued in 1998 ("the Wider Markets guidance").

2. The guidance generally applies to commercial activity of a non-statutory, discretionary nature.²

3. The guidance, a departure from the previous policy, was designed to encourage departments to make the best use of existing public assets. As such, a number of safeguards and triggers for action were introduced to manage risk. These included requirements for the Treasury to be consulted in certain circumstances.

4. The original 1998 edition stated (at footnote 2 on page 10):

"Where annual receipts from Wider Markets appropriated-in-aid exceed 5 per cent of departmental (ie Class) cash-limited provision, departments should consult Treasury spending teams."

5. The guidance was revised in December 2001, to reflect the transition to Resource Accounting and Budgeting (RAB). The revision states:

"Treasury spending teams should be consulted where a department's aggregated annual receipts from wider markets projects exceed 5 per cent of discretionary spending within the Departmental Expenditure Limit."

6. This applies to net receipts (ie income from wider markets activities after the costs of providing the activity have been deducted) and to gross discretionary spending.

WIDER MARKETS ACTIVITY

7. The intention of the 5 per cent threshold in the Wider Markets guidance was to give the Treasury early warning of particularly high levels of wider markets receipts to ensure that departments' core activities do not become dependent on receipts from wider markets activity, which may be uncertain and irregular.

8. The requirement is only that departments *consult* the Treasury. The Treasury would normally expect to permit departments to continue to generate wider markets receipts above this level, subject (where necessary) to conditions, which might include continued monitoring by the department (in the case of Agencies and NDPBs) and the Treasury. The key consideration for the Treasury is that the provision of the departments' core services remains sustainable.

9. The guidance also states that all projects where the full annual cost is more than £1 million require Treasury approval. This threshold was derived from the Treasury's Fees and Charges Guide. In practice, as departments should be utilising existing assets, the Treasury would not expect them to incur major expenditure in establishing wider markets products or services. Contentious and repercussive projects must also be approved by the Treasury.

SCOPE

10. The 5 per cent threshold applies at departmental level. Within that, it is for departments to monitor and control the activities of their agencies and NDPBs (such as the Research Councils).

PRECEDENT

11. To date, the Department of Trade and Industry has not consulted the Treasury regarding wider markets receipts under the terms of the Wider Markets guidance because, at departmental level, receipts have not reached the level of 5 per cent of discretionary spending.

REVISION OF WIDER MARKETS GUIDANCE

12. The Treasury is currently revising the Wider Markets guidance. This will reflect developments in competition legislation, the Freedom of Information Act 2000 and Treasury guidance: *Charging for Information: When and How*.³ The revision to the guidance will also take the opportunity to specify more precisely the circumstances under which departments should consult the Treasury, in particular to specify when net and gross figures should be used (see paragraph 6).

Mr Brian Glicksman
Treasury Officer of Accounts
HM Treasury
April 2002

¹ www.hm-treasury.gov.uk/mediastore/otherfiles/sgswm.pdf

² Further details about the applicability of the guidance are set out in paragraph 7 of the Wider Markets guidance.

³ www.hm-treasury.gov.uk/mediastore/otherfiles/charging_for_info.pdf

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